# CERTIFICATE

This is to certify that this dissertation work on **"AAN MALADU"** has been carried out by **Dr.S.THILLAIVANAN** during the year 2010-2013 in the **Post Graduate Department of Maruthuvam, Government Siddha Medical College, Chennai-600106** under my guidance and supervision in partial fulfillment of regulation laid by **The Tamilnadu Dr. M.G.R Medical University, Chennai** for the ***final M.D*** **(siddha) Branch I- MARUTHUVAM** examination to be held in **April 2013**.

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A STUDY ON

# AAN MALADU

*the dissertation Submitted by*

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**THE TAMILNADU DR. MGR MEDICAL UNIVERSITY**

*In partial fulfillment of the requirements*

*For the award of the degree of*

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**BRANCH-I MARUTHUVAM**


**POST GRADUATE DEPARTMENT OF MARUTHUVAM**

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**- « ¸ò¾¢Â÷ ¨ Åò¾¢Â º¦ó¾¡Á½¦ (À¡¼ø ± ñ -1)**

# Introduction

# INTRODUCTION:

**Siddha- not only for the body;**

**But special for the soul.**

¸¼× û Å¡úòÐ :

´ ý Ú «Å ý ¾¡§É;þÃ ñ Î «Å ý þ ý ÉÕ û;
¿¦ý È É ý ã ý È¦Û û; ¿¡ ý Ì ¯½÷ó¾¡ ý ; ³ óÐ
¦Å ý È É ý ; ¬ Ú Å¦¡ó¾É ý ; ² Ø ¯õÀ÷ î
¦ º ý È É ý ; ¾¡ ý þÕó¾¡ ý ;¯ ½÷óÐ ±ð§¼.

-¾¦ÕÁó¾¦ÃÕ (À¡¼ø ± ñ :1)

Although modern medical system updating its scientific validation second by second a less bit of attention present all over the world among traditional system of medicine. Nowdays, that attention becoming greater day by day and not much time need to equalize modern medical system in all aspects like scientific validation, documentation etc. And there is no exception for our siddha system to achieve most successful and popular .

The siddha medical system is one of the most famous ancient Indian medical system widely practiced in the Southern Regions of India, and it is part of trio-Indian system of medicine. The term siddha derived from the word ‘siddhi’ which means “perfection (or) achievement (or) Eternal bliss”. The perfection not only in the medical aspects and also for ‘mukthi of the soul’. The physicians who practicing siddha aimed to attain the perfection of Health in all state that is physical, psychological, and social .

***“If you cannot be a king, be a healer”***- a famous quote .

The siddha medicine is said to have originated from Lord shiva who revealed into Uma. And the system is developed by the group of spiritual people with supernatural powers named as *siddhars* (followers of shiva). They are mainly 18 and 70,000-80,000 totally.

The performance of siddha system on body, mind and soul depends 96 basic principles (thathuvas) considered as forming the Human body responsive for physiological function. These thathuvas are universal to all human beings in normal condition. And 3 Humours(thadhus) named vayu, azhal, Iyam in 96 thathuvas responsible for normal physiological function.If any alteration in the 3 Humours responsible to cause pathological statue. These 3 thadus are nourished by their respective elements in food.

The system widely explains the origin of 96 thathuvas from embryo and disintegration of thathuvam at death. These thathuvas (principles) consists of physical component of human body and also mental, intellectual components, sensory and motor organs and co-ordination with soul, includes 5 elements which forming basis of world and Human beings.

ÓôÀÐõ ÓôÀÐõ ÓôÀò ¾ÚÅÕõ
¦ºôÀõ Á¾¢û ¯¨¼ì §¸¡Â¢Öû Å¡úÀÅ÷
¦ºôÀõ Á¾¢û ¯¨¼ì §¸¡Â¢ø º¢¨¾ó¾À¢ý
´ôÀ « ¨ ÉÅÕõ µð¦¼Îò ¾¡÷¸§Ç.
-¾¢ÕÁó¾¢ÃÕ (À¡¼ø ± ñ :154)

The perfection of siddha apart from medical aspects, originates from perfection of mankind (anima) and ends up in the perfection of soul (samathi - means merge/ bring together/self realization).

The peculiarity of siddha medical system which contains 3 major portion i.e., prevention, Treatment, Rejuvenation.

Prevention aspects of siddha system not only during endemic& epidemic attacks and also on every seasonal changes & variations ,to produce natural immunity, through diet modification and the use of kalpa medicines.

Treatment aspects includes Diagnosis through envagai thervugal(8 vital examines),naadi (Pulse Diagnosis), Neerkuri, Neikkuri (Urine Analysis), measuring the forearm using thread (mani Kadai nool) and treating and managing the Disease (which formed by Disorder of 3 humours) using Herbal products, inorganic substances, Animal products (thavara,thadhu, sangama things).

Rejuvenation therapy of siddha medicine (syn -kaya kalpa medicine) is always special for that system. Kaya Kalpa evolved from two words ,Kaya-means body, Kalpa-stone like, together meaning of keeping the body as strong as stone to prevent from Diseases, aging process & death too. Kalpa medicines when taken in normal physiologic conditions helps to promote and restores health (pothu karpam) and promote health in certain Diseased state i.e., sirappu karpam.

The art of living depends upon several factors including maintenance of heredity with healthy progeny. Healthy progeny depends upon healthy gametes from both male and female partners of conjugated life style. Current epidemiological evidence suggests that 15% of couples experience infertility in the world and half remain untreated and/or unresolved. The famous tamil couplet which explains importance of progeny is,

Ì ÆÄ¦É¦Ð Â¡Æ¦É¦Ð ± ý À÷ ¾õÁ ì ¸ û
ÁÆ ¨ Ä ¦ º ¡ ø § ¸ Ç ¡ ¾Å÷.
- ¾¦ÕÅ û Ù Å÷.

À ¨ ¼ôÒ ÀÄÀ ¨ ¼òÐ ÀÄ§Ã¡ Î ¯ ñ Ï õ
¯ ¨ ¼ ¦ ÀÕõ ¦ º ø Å§Ã ¬ Â¦ Û õ
þ ð Î õ ¦ ¾ ¡ ð Î õ ¸ Å¦úóÐõ
¦ ¿ öÔ ¨ ¼ « ¡ ¦ º ¦ ø ¦ ÁöÀ¼ Å¦¾÷ òÐõ
ÁÂ ì Ì Û Á ì ¸ ¨ Ç þ ø Ä ¡ ÷ ì Ì
ÀÄ É¦ø ¨ Ä ¾ ¡ ý Å ¡ Øõ ¿ ¡ §Ç .
- ÒÈ¿ ¡ ë Ú
« ¾¦ ÅÃ Ã ¡ ÁÀ ¡ ñ ÊÂ ý .

Infertility bears a social stigma. It means failure of a couple to become parent after one year of successful married life.

In India approximately 15% of couple experience some difficulties when try conceive. Infertility may severely affect the couples physiological harmony, sexual life and social function Nowdays, the incidence of infertility is comparatively higher in males.

Male infertility is a vexing clinical problem. The incidence of male infertility varies in different Region. The incidence of infertility among males 40%, female 40%, both sex 20%.

In olden days,our life was in co-ordination with nature.In the recent days, Life style modification and Diet changes are the major cause for many health problems includes male sexual problems . Siddha Literatures have described many medicines for the treatment of male infertility and provides a very good solution to these problems. One such siddha medicine namely “ ISABGOL CHOORANAM” has been selected for my dissertation work , whose efficacy is not known.

# Aim & Objectives

## AIM AND OBJECTIVES

### AIM OF THE STUDY:

**Primary aim:**

To assess the safety and efficacy of the siddha drug, **Isabgol chooranam**.

**Secondary aim:**

To evaluate the effect of Isabgol chooranam to increase the sperm concentration, viscosity of semen and to reduce premature ejaculation, nocturnal emission in AAN MALADU.

### OBJECTIVES OF THE STUDY:

- To collect the authorised measures and review the ideas of Aan maladu in Siddha and modern literatures.
- To have an idea about the relation of the disease with **age,occupation,economic states, habits, family history and climatic conditions.**
- To expose the efficacy of siddhars diagnostic principles such as mukkutram, envagai thervugal, eazhu udalthadhukkal, neerkuri and neikkuri.
- To have detailed clinical investigations.
- To have a clinical trial on the disease **"AAN MALADU"** with the siddha medicine, **"ISABGOL CHOORANAM"** .
- To evaluate ,
    - **Bio-Chemical analysis**
    - **Toxicity study** [acute & subacute]
    - **Pharmacological action**
- To handle the modern parameters to confirm the diagnosis and prognosis of the study.

# Review of Literature

# Siddha Aspects

## REVIEW OF THE SIDDHA LITERATURE :

According to siddha literature & siddhars view, vindhu or sukkilam (semen) is an important which is compared to Lord Shiva. Vindhu anotherwise known as 'Sukkilam' is the final and important constituent of 7 thathus, which giving birth to embryo. Most of the siddhars told about vindhu and its importance to reach & merge with Lord Shiva , that is the end stage of "ATTANGA YOGAM".

Although all siddhars spoken about vindhu, some of them only briefly explained the formation, importance, embryo formation etc . For example, the famous saint THIRUMOOLAR briefly explained the formation of vindhu (semen),physiological importance, disadvantage of masturbation, timing for coitus, state of orgasm, embryo formation, determination of foetal sex by male partner , etc in his Thirumandhiram. Some others are Thiruvalluvar in his Gnanavettiyan , Bogar in his janana sagaram, Brama muni in his karukadai suththiram, karukkadai nigandu are well known on this topic.

Some of the literature views from above told books and some other books are given below. These literatures are just like pickles for the main dish, topic.

**Åłóð þÂø :**

**Åłóð §¾¡üÈõ**

þÃº Ó¾Ä¡É ²ú¾¡Ð ã ýÈ‡ý
¯¡‡Â ¾‡É ò¾‡ý ´ÕÒüÀÉ‡ §À¡ø
«¡‡ÂÐÇ‡ Å‡óÐÅ¡Ì §Áú ã ýÈ‡ý
ÁÕÅ‡Â Å‡óÐ ÅÇÕõ ¸¡Âò¾‡§Ä.

-¾‡ÕÁó¾‡Ãõ 1934

Although 7 thathus nourishing our body after getting absorbed from GITract , 3 are the major things that is saaram(chyme), raktham (blood)& vinthu (semen). The semen seems to be a waterglobules at the hit of the grass. The sperm need 21 days for its full growth in our body.

**Formation of vindhu (semen) :**

According to siddhars 1 drop of venner made from 80 drops of senner (blood). 1 drop of vindhu made from 80 drops of venner. So ,6400 drops of senner (blood) needed to make one drop of vindhu.

-Udal thathuvam page.no.176

ÅIóÐ ¿¡¾ Ò½÷îºÂ¦ý ÀÂý :

ÒÈõ «¸õ ±í Ìõ Ò Ì óÐ´ Ç¦÷ Å¦óÐ
¿¦Èõ «Ð ¦Å ñ ¨Á;¿¦¸ú ¿¡¾õ ¦ºõ ¨Á
¯È Á¸¦ú ºò¾¦ º¦ÅÀ¡¾õ ¬Ôû
¾¦È¦É¡Î Å¦Î «Ç¦ì Ìõ ¦ºÂø ¦¸¡ ñ §¼.

-¾¦ÕÁó¾¦Ãõ 1929

The colour of the semen is purely white & the colour of ovum is red.The joining of the both , semen & ovum leading to , fertilization of ovum by the sperm to form new energy, foetus.

Á í ¨ ¸Â ¨ Ã Ü¼ §Å ñ ÊÂ ¸¡Äõ;

¦ºöÔõ « ÇÅ¢ø , ¾¢Õ¿¡ ý Ó Ü÷ò¾§Á
±öÔõ ¸ ¨ Ä,¸¡Äõ,þóÐ ÀÕ¾¸¡ø
¨ ¿Ôõ þ¼òÐ µÊ,¿ý ¸¡Á ë ø ¦¿È¢
¦ºö¸, ÅÄõ þ¼õ ¾÷óÐ Å¢ Î ¸§Å.

-¾¢ÕÁó¾¢Ãõ 1941

**Time for coitus:**

It is noted that 6 hours before sunrising is the apt time for sexual intercourse. During ejaculation it is better to maintain our breath either in Idakalai/pinkalai/suzhumunai to make the purpose better.

Å¢óÐ ´Æ¢Â¡¾ÀÊ Ò½÷¾ø :

§Â¡¸õ « ùÅ¢óÐ ´Æ¢Â¡Å ¨ ¸ Ò½÷óÐ
¬ ¸õ þÃ ñ Î õ ¸Äó¾¡Öõ ¬ í Ì ¯È¡ô
§À¡¸õ º¢Å§À¡¸õ;§À¡¸¢ ¿ü§À¡¸Á¡õ;
§Á¡¸õ¦¸¼ ÓÂ í ¸¡÷ ã¼÷Á¡¾÷ì §¸.

-¾¢ÕÁó¾¢Ãõ 1960

**State of orgasm :**

And it is a kind of art & stage of yoga, that is to reach the stage of orgasm in female without losing a drops of semen.

**ÅtóÐ ¿ìì¸õ Ü¼¡Ð :**

ÅtòÐì Ì üÚ ¯ ñ À¡ ý Åt¨ Ç× «ÈtÂ¡¾Å ý
ÅtòÐì Ì üÚ ¯ ñ ½ ¡Áø,ÅtòÐ Íð Î ¯ ñ ÀÅ ý
ÅtòÐì Ì üÚ ¯ ñ À¡ Ét ø , §ÅÚ «Ä ý ®üÈÅ ý
ÅtòÐì Ì üÚ ¯ ñ ½ ¡Áø, ÅtòÐ Åtò¾¡ ý « ý §È .

-¾tÕÁó¾tÃõ 1964

It is important that seeding the seeds ,Instead of eating it by frying/raw ,to get the maximum benefits of this. Similar to that everyone should utilize the semen as purposeful one, without losing it unnecessarily.

**§Â¡¸t ¬ Å¾ü Ì ÅtóÐ ¨ Å «¼ì¸ø :**

À¡÷ì¸t ý È Á¡¾¨ Ã À¡Ã¡Ð, « ¸ ý Ú §À¡ö
µ÷ì¸t ý È ¯ ûÇõ ¯Õ¸, «Æø ã ðÊ
À¡÷ì¸t ý È ¸ ñ , ¬ ¨º À¡úÀ¼, ã Äò§¾
§º÷ì¸t ý È §Â¡¸t ºtÅ§Â¡¸t ¾¡§É.

-¾tÕÁó¾tÃõ 1937

**Importance of semen in yoga :**

It is better to leave our bad thoughts among the female persons , because it may lead to loss of our uyir sakthi (life source fire) which helps to reach the lord shiva, which is the end stage of yoga (samathi).

Å¢ó¾¢É¡ø À¢ÈôÒ :

¾ó ¨ ¾ Å¢ò¾¾¢ º¡Ãò¾¢ÄÃÅÁ¡Ô¾¢òÐ
³ óÐ â¾õ ¾¡¸ ¯ôÀÐ ¯Å÷ À¼÷óÐ
Å¢óÐ §ÁÄÀ¢ ÅÕ¾ø ¨¾ Á¡º¢ À í Ì É¢Ôõ
Å¢óÐ Å¡Ö¾ò ¾¢Ä¸¢Â ¿¡¾ÓÁ¢Ð§Å.

-¾¢ÕÅû Ù Å ¿¡ÂÉ¡÷ ¨ Åò¾¢Â º¢ó¾¡ÁÉ¢ 800, Àì¸õ 3

**Birth by semen :**

According to the saint Thiruvalluvar ,The semen of male partner heps to form embryo after fertilization .The embryo grows up by the influence of 5 elements (pancha bootham). The birth of foetus should takes place in the tamil month named ‘Thy’ andso the fertilisation must be on the month of “maasi & panguni “

Í ì¸¢Ä Ì ½õ:

¯ ñ ¨ ÁÂ¡É Í ì¸¢Ä ÓÀ¡Â Á¡Â¢Õó¾Ðõ
¦Å ñ ¨ ÁÂ¡¸¢ ¿¦¡§Ä Å¢¨ ÃóÐ ¿÷ ¾¡ÉÐõ
¾ ñ ¨ ÁÂ¡É ¸¡Â§Á ¾ÕòÐÕÅ Á¡ÉÐõ
¦¾ý ¨ ÁÂ¡É »¡É¢¸û ¦¾ÇóÐ ¨ Ãì¸ §Å Ï §Á.

-º¢Å Å¡ì¸¢÷ À¡¼ø, Àì¸õ ± ñ .202

**Property of Semen :**

At the time of copulation, the semen is ejaculated. The prostatic fluid gives the semen a milky appearance. In the early minutes after ejaculation, the sperm remains immotile, possibly because of the viscosity of the coagulum. As the coagulum dissolves the sperm become highly motile.

**Í ì ¸ÄÒ ¨¾ «¼ì ¸É ¡ø ¯ ñ ¼¡ Ì õ §¿¡ö ¸û :**

Í ì ¸Ä ó¾ ¨ É «¼ì ¸ý
ÍÃÓ¼É÷ì ¸ð¼¡ Ì õ
Àì ¸Á¡ö ¨ ¸ ¸¡ø ºóÐ
À¡ÃÁ¡ö ÅÆ þÈ í Ì õ
Áì ¸ Á¡÷ §¿¡Ô ñ ¼¡ Ì õ
Á Ì ó¾ Î õ ÀÃ§Á ¸ó¾¡ ý
¾ì ¸§¾¡÷ §À¡ÐÁ¡ ¸ý
¾¡ò¾§¾¡÷ Å¡ÔÅý Ü §È.

- ¯¼ø ¾òÐÅõ Àì ¸õ.± ñ -337

If the semen is controlled against nature, it may lead to increase body temperatue, oliguria, joint pain in arms & legs, chest pain, spermatorrhoea, etc .

**Features of Decreased semen level :**

At the time of copulation , the amount of semen ejaculation ll decrease with or without pain, sometimes irritation of penis & pricking pain in the scrotum.

- Noi Nadal-Noi Mudhal Nadal thirattu Part-1

**þó¾¡Â À¡ð ¨ º:**

³ Â Á ¨ Ä À¡ø§Á¡÷ §¾É¡î ºÂí¸Ä¡ ¸õÁ¨ Å ¨ Â
¨ ÂÂÁ ¨ Ç Â¡¾Èóð ¦¸¡û Ù Å¡ ¨ ÂÂÁ ¨ Ç
Ôò¾Áò ¨ ¾ Ó ý §É Õ É Âó¾¡Â À¡ð ¨ º
Ôò¾Áò ¨ ¾ á Ä¡ ¾ ¨ Ã§Â¡÷.

-§¾Ã ý ÂÁ¸ ¦Å ñ À¡ À ì ¸ ± ñ .65

**Examine the semen :**

If the semen is,

1. White and akin to the butter, it is excellent.
2. White and akin to curd, it is very good.
3. White and akin to the milk, it is good.
4. White and akin to the butter milk, it is fair
5. Akin to the honey in colour and consistency, it is average.
6. Akin to the ghee in colour and weight, it is poor.
7. Akin to the toddy is colour and weight, it is very poor.
8. Akin to the water, it is very bad.

# ¬ ñ ÁÄ Î :

"À¡ÃôÀ¡ ¦À ñ ÁÄ¼¡õ ¸÷ôÀì §¸¡½ý
Àì Ì Åò¨¾ ¦º¡ø¸§È ý À ñ À¡ö §¸ Ù
¬ÃôÀ¡ ¬ ñ ÁÄ§¼ Â¡ÕÁøÄ¡ Áø
«ôÀ§É ¦À ñ ÁÄ Î Â¡ÕÁø¨Ä" .

- ¸÷ôÀì §¸¡û
- « ¸ò¾Â÷ ¨ Åò¾Â ºøÄ¨Èì §¸¡¨Å
- ¬ òÁÃðº¡Á÷¾õ

**¬ ñ ÁÄ Î Ì ½õ:**

À¡÷ì¸§Å ¬ ñ Á¸É ý ÅóÐ ¾¡Ûõ
À¾Á¡É ¾ò¾ôÒ Âø Ä¡¾¾¡Öõ
²÷ì¸§Å ºÄ Á¾ø Á¾ó¾¡Öõ
±ÆÄ¡¸ ¯Â÷ôÀüÚÂ Õó¾¡Öõ
§º÷ì¸§Å ãò¾Ãò¾ø Ñ¨Ã¾¡ý §À¡Öõ
¦ºÂÄ¡É ¸ÕÅÐ×õ ¾¡ì¸Á¡ð¼¡.
- ä¸ÓÉ
-Á¸Ç÷ ÁÕòÐÅõ

ÜÈÉ¡÷ ÒÕ „ Õ¼ ÅóÐ ¾¡Ûõ
Ì ½Á¸ ¾ò¾ôÒ þøÄ¡ò¾¡Öõ
ÁÈÂ§¾¡÷ ºÄÁÐ Á¾ó¾¡Öõ
Á¸Å¡¸ ¯ÂÃüÚ þÕôÀ¾¡Öõ
ºÈÂ§¾¡÷ ãò¾Ãò¾ø Ñ¨Ã¾¡ý §À¡Öõ

º¢ÈôÀ¡ É ¸ÕÅÐ¾¡ ý ¾¡¢ò¾¢¼¡Ð
§¾È¢Â§¾¡÷ Á í ¨ ¸Â÷¸ û ÁÄ§¼ Â¡Å¡ û
¦¾Ç¢Å¡ É ¬ ñ ÁÄÊ ý ¾ý ¨ Á¾¡§É.

- « ¡¢¨ ÅÂ÷ º¢ó¾¡Á½¢,Àì ¸ ± ñ :153

**<u>According to Yugi Saint & the Text 'Arivaiyar sinthamani' :</u>**

- ❖ Lack of sweetness in semen
- ❖ Buoyancy on water
- ❖ Absence of Virility
- ❖ Frothy maturation

The above told characters of semen mainly contributes infertile man.

**MALE INFERTILITY IN T.V.Sambasivam pillai DICTIONARY :**

The Semen in such cases will be devoid of sweetness and life and float on the surface of water. The urine also will be frothy. Such man is incapable to impregnate women.

**<u>AETIOLOGY:</u>**

**¾¢Õ ã Ä÷ Ü Úõ §¿¡ö ¸¡Ã½ õ:**

µ¦Ãð Î î º ý É¢ ¯Æ ñ ¼Ð ¦À ñ Ï ì Ì õ
Å¡¦Ãð Î ¬ Ï ì Ì õ Á¸ò¾¡õ Í¸º ý É¢
§¿¡¢ð Î ô À¡÷ì¸¢ø ¿¢¸úó¾Ð ¦Åù§ÅÚ
À¡¦Ãð Î ¦Áöîº À Ì ò¾ Ó ¨ ÈÀ¡§Ã.

-¾¢Õ ã Ä÷ ¸Õì¸¢¨¼ ¨ Åò¾¢Âõ 600,
À¡¼ø ± ñ :37

¦À¡Õû Å¢Çì¸õ:

¦À ñ ¸Ù ì Ì 8 Å ¨ ¸ º ý É¢Â¡Öõ, ¬ ñ ¸Ù ì Ì Í ¸ º ý É¢ Ó¾ü¦¸¡ ñ ¼ ÀÄÅ ¨ ¸ º ý É¢Â¡Öõ ¸÷ôÀõ Å¡ö ì ¸¡Áø §À¡ Ì õ.

**MALE INFERTILITY DUE TO INFECTIONS:**

¸ÕõÀÉ¢ ¨ ºÂõ ¨ Á :

¦¾¡¢ó¾¦¾¡Õ Ì ½ ì Ì È¢¸û §¾¡ ý ÚÁôÀ¡
¾¢ÈÁ¡ É ¸Õ ý À É¢ ¨ º Å¢ó ¨ ¾ì ¦¸¡øÖõ
À¡¢óò¦¾¡Õ ¸÷ôÀò ¨ ¾ « Æ¢Âô À ñ Ï õ
À ñ À¡ ¸ ÂÅ÷ ¸ Ù ì Ì À¢û ¨ Ç Â¢ø ¨ Ä
- « ¸ò¾¢Â÷ ¨ Å Ý ¡¢ á ø
- §¿¡ö ¿¡¼ø §¿¡ö Ó¾ø ¿¡¼ø ¾¢Ãð Î
À Ì ¾¢ -2, À ì ¸ ± ñ :66

The complications of **the karumpanisai ammai** are,

-Death of the sperm cells in male

-Abortion in pregnant women

-Produce in sterility in both men and women.

**MALE INFERTILITY DUE TO TRAUMATIC LESIONS:**

1.¸øÄ¢ ¨ ¼¸¡Äõ( « ñ ¼ Å÷Áõ,À¢º ¸¡Äõ)- « ÊÀ Î Å¾¡ø Å÷Á Ì È¢Ì ½ õ:

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2.¯î º À¾ôÒ ¸¡Äõ- «ÊÀ Î Å¾¡ø Å÷Á Ì È Ì ½õ:

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¬ ¾¡Ãõ- Å÷Áõ-108

**TOPICS RELATED TO MALE INFERTILITY IN SIDDHA LITERATURE:**

Í ì¸Ä Å¡¾õ:

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- ä¸ ÓÉ
-§¿¡ö ¿¡¼ø §¿¡ö Ó¾ø ¿¡¼ø ¾Ãð Î
À Ì ¾-2, À ì¸ ± ñ :574

Emaciation, constipation, oliguria, bleeding from the nose, phlegm accumulation due to increased kapham, breathlessness, loss of taste. All the symptoms are associated with affected Sukkilam, according to Yugi.

**Í ì ¸Ä Å¡¾õ:**

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**- « ¸ò¾¢Â÷ ¨ Åò¾¢Â º¢ó¾¡Á½¢ ¦Å ñ À¡-4000**

À¡¸õ-1.À ì ¸õ-60

**Í ì ¸¢Ä Å¡¾õ:**

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¦¸¡ì ¸¢Â¾¢§Ä ¸Àõ Ò ì ¸¢§Â Ì Á¢È¢Î õ §¸¡ ¨ ÆÂÐ×§Á ÅÊÔõ
Ü ÕÁ¸§Á ¿¢ý Ú §Ä¡¸ÁÐ ¦Åó¾ Á½ø Ì ½õ Å¢º¢ÂÐ §À¡ø Õº¢Â¡ö
µ ì Ì Á¢É¢ Í ì ¸¢Äõ « É§ÄÈ¢ ÒÉø §À¡Ä¡õ µÊ º¢¾Úõ ¸Õ¸¢
´ò¾ Ó É¢ À¸Õõ × ¨Ã§À¡ø ¾Á¢Æ¡¸§Å µ¾¢É¡÷ ¾Ã½¢§Â¡÷ì §¸.

**- Å¡¾ §¿¡ö ¦¾¡ Ì ¾¢( ¿¢¾¡ Éõ)**

**<u>§¿¡Â¢ý ¿¡Ê :</u>**

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**-À¾¦É ñ º¢ò¾÷ ¿¡Ê º¡Š¾¢Ãõ, À ì ¸ ± ñ :89**

**Uyir thathukkal / Mukkutram:**

These are all the main three pillars which functioning the body with an equilibrium state. Any disturbance in that state leads to diseased condition in our body.
The three pillars are,

1. Vali
2. Azhal
3. Iyam

**1. Vali or Vayu:**

Vali is not mere wind, but also that which causes motion, energy and sensation of every cell in the body. Vayu relates to nerve force. It is responsible for all movements in the mind and the body. In human body it controls the Gnanendriyam (sensory actions) & Kanmendriyam (motor activities)

**Vali generally lives in,**

Abanan, Edakalai, Kamakodi, Undhiyin Keezh Moolam, Hip region,
Bones, Muscles, Nerves, Joints, Skin, Hair follicles, Stools.

**Varieties of Vali :**

According to their location and functions they are classified into 10 types.

1. Uyirkkaal (Pranan)
2. Kezhnokkum Kaal (Abanan)
3. Paravukaal (Viyanan)
4. Melnokkum Kaal (Udhanan)

5. Nadukkaal (Samanan)

6. Naagan

7. Koorman

8. Kirugaran

9. Devadhathan

10. Thananjeyan

**1.Uyirkkaal (Pranan) (Heart Centre)**

It regulates the respiratory, cardiac and digestive system. By joining with pingalai it forms azhal naadi. It is responsible for bio comfusion in the body.

**2. Kezhnokkum Kaal (Abanan) (Mooladharam Centre)**

It regulates the defecation, micturation, menstruation, parturition and ejaculation. It corresponds to the pelvic plexus and the lower part of the gut.

**3. Paravukaal (Viyanan) (fore head centre)**

It spreads all over the body and all nerve endings. It regulates constriction and relaxation of the voluntary and involuntary muscles. The neurological problems were due to this Vayu. It spreads the nutrients to all over the body from the digested food.

**4. Mel Nokkumkaal (Udhanan)**

It is responsible for speech, vomiting, hiccough and sneeze.

**5. Nadukkaal (Samanan):**

It is responsible for digestion and it spreads the nutrients to all over the body. Joining with suzhumuna it forms the Kaba naadi. It neutralizes the other four Vayus.

**6. Naagam:**

It is responsible for the intelligence and derangement of this Vayu causes impaired memory. It helps to opening and closure of eyelids.

***7. Koorman:***

This is responsible for the vision, Yawning and Lacrimal secretions.

***8. Kirugaran:***

It is responsible for salivation, nasal secretion, hunger, sneeze, cough and concentration.

***9. Devadhathan:***

It is responsible for laziness and anger.

***10. Thananjeyan:***

It produces swelling all over the body and leaves from cranium only after the 3rd day after death. It is responsible for the decay of the body after death.

**In Aan Maladu ,Kezhnokkum Kaal & Paravukaal affected.**

**II.*Azhal*:**

This is nothing but the characteristics of fire such as burning, boiling and heating etc. It corresponds to the functions so thermo genesis production of heat necessary to maintain integrity of the human circulatory system. Azhal is classified into 5 types. In mainly governs enzymes & hormones.

**Azhal lives in:**

Between heart & the navel, Sweat, lymph, blood, stomach, urinary bladder, saliva eye and skin

| Name | Location | Function |
|---|---|---|
| 1.Akku anal (Analagam) | Stomach,Small intestine | Dissolvent& Digestive |
| 2.Vanna eri (Ranjagam) | Liver, Spleen,Stomach | Colouring,Pleasing,Gratifying |
| 3.Attralangi (Sathagam) | Heart | Effective efficient |
| 4.Nokku Azhal (Alosagam) | Eyes | Seeing, consideration |
| 5.Ollolithee (Prasagam) | Skin | Complexion of the skin |

**In Aan Maladu, Sathaga Pitham affected.**

**Iyyam:**

It imparts moisture. Iyam is located in samanan semen, head, tongue, flat, bone marrow, blood, nose, chest, nerves, brain, large intestine, eyes, stomach & pancreas.

| Name | Location | Function |
|---|---|---|
| 1. Alli Iyam (Avalambagam) | Lung | Supports all the others |
| 2. Neerpi Iyam (KiIethagam) | Stomach | Moistens and nourishes the food |
| 3.Suvaikanna Iyam (Pothagam) | Tongue | Take care of perception |
| 4 .Niraivu Iyam (Tharpagam) | Head | Refrigerant effect to eyes |
| 5. Ondri Iyam (Santhigam) | Joints | Stability,Lubrication movementsof joint |

**In Aan Maladu, Tharpagam & Santhigam affected.**

**Udal Kattugal : (Seven Physical Constituents)**

**1.Saaram – Chyle (Plasma):**

It is responsible for the growth & development. It keeps the individual in good spirit and nourishes the blood.

**In Aan Maladu, Saaram affected .**

**2. Senneer – Blood:**

Blood imparts colour to the body and nourishes the muscle for the ability.

**3. Oon – muscle:**

Gives shape to the body.

**4. Kozhuppu – fat:**

It helps in lubricating the different organs and maintains oily matter of the body.

**5. Enbu – bone:**

It supports the system and responsible for the posture movement of the body.

**6. Moolai – Marrow:**

It fills the bone cavity, nourishes semen and imparts strength, endurance and shiny appearance.

**7. Sukkilam (sperm):**

It is responsible for the reproduction.

**In Aan Maladu ,Sukkilam affected.**

**Enn vagai Thervugl (Eight diagnostic methods in Siddha):**

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It is the unique and special method in Siddha

- A Compendium Of Siddha Doctrine Page:301

‘ Envagai thervugal is the specialty of Siddha diagnosis. These are the instruments for the physician to diagnose disease.

**1. Naadi:**

The three Uyir thaadukkal felt through the pulse is called Naadi.

| Naadi | | Vayu | Uyir thathu | Ratio |
|---|---|---|---|---|
| Edakalai | + | Abanan | - Vatham | – 1 |
| Pinkalai | + | Piranan | - Pitham | – ½ |
| Suzhumunai | + | Samanan | - Kapam | – ¼ |

**Parisam:**

Observations by touch, temperature, sensory impairments, masses, nodes, swelling, and texture of the skin, pain, hardness, edematous, and dullness shall be noted.

**Naa:**

Signs and symptoms in the tongue are considered here. Size, appearance, thickness, color (pigmented, magenta) fissured (longitudinal,

transverse) coated, geographical patches, oral hairy leucoplakia, candida, aphthous ulcer, sense of taste, saliva secretion.

**Niram:**

The color of skin is mainly considered here but also the change in other organs.

**Mozhi:**

The change in the normal sound of voice mainly uratha oli (Valithel), thazhntha olli (Melithal), physiological and mental status can also be noted during conversation.

**Vizhi:** Colour, warm, burning sensation, irritation, visual perception

**Malam:** Nature, quantity, colour, odour, froth, consistency are noted.

***Moothiram:***

The urine examination classified into two types.

a) **Neerkkuri**

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-§¾Ã ý

-§¿¡ö ¿¡¼ø §¿¡ö Ó¾ø ¿¡¼ø

Urine is to be observed for the following characters

- Niram (color)
- Edai (specific gravity)
- Manam (smell)
- Nurai (froth)
- Enjal (deposit)

**b) Neikkuri:**

It is an important test to assess the predominantly affected humour.

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On the day before the urine test one should take food, consisting of all the six tastes at the regular time based on one's digestive fire; after a sound overnight sleep, urine should be collected in a glass ware and the test should be done before 90 minutes from dawn.

A drop of oil is dropped at the centre of urine (bowl) without any shake. It should be ensured that the Sunlight falls on it, but is not disturbed by the wind. A keen observation of the oil drop suggests the condition of the patient. If the oil drop takes the

shape of a snake, it indicates Vatha disease. If it spreads like a ring it indicates Pitha and if it stands like a pearl it indicates Kapha disease.

If there is a combined shape like a ring in a snake, or snake in the ring, snake and a pearl or a pearl in the ring, it indicates combined derangement of humors.

White layer starts with disturbed Azhal and eventually involves all the three uyir thathus-thus resulting in various patterns of oil spread in the urine surface.

**Noi Neekam (Treatment):**

In Siddha system the main aim of treatment is not only for the removal of physical illness but also the mental illness. Treatment is considered with prevention and improvement of the general body condition (rejuvenation) also.

This is said as follows

Kappu - Prevention

Neekkam - Treatment – curative

Niraivu - Restoration – promotive

While treating the disease the following principles must be noted.

So it is essential to diagnosis properly to know about the etiology, the nature of the patient, the severity of illness, the seasons and the time of the occurrence of the disease.

**Line of Treatment:**

1. To bring the three Kutrams in equilibrium
2. Medicine (Internal)
3. Diet and advise

**1.To bring the three Kutrams in Equilibrium:**

Since Siddha system of medicine is based on Mukkutra theory, the purgation (Kalichal Maruthuvam) was given by for the vitiation of three humours.

Agasthiyar Kuzhambu 65mg was administrated at early morning as a purgative in the prior day of treatment.

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**YOGA AND RELAXATION THERAPY:**

Yoga has been practiced in India for a number of centuries. There are several methods of yogic practice originating from different school of thoughts. Yogic exercises improve the psychological functions of the individual. If yoga is practiced daily it gives efficient relaxation to the mind and produce freshness to the entire psychosomatic apparatus to restart its work with greater vigor and strength.

When one practices all the three methods of yoga namely postural exercise, breathing exercise, meditation daily one after another remarkable results could be obtained to maintain a good physical and mental health. I shall deal with only such asana as are useful in curing ailments and maintaining good health for the male infertility.

**1.Sarvangasana :**

The principle cultural benefits of sarvanga asana lie in keeping the endocrine glands healthy. It is stimulates the pituitary and thymus glands and keeps the

prostate gland healthy. This asana keeps the sex glands healthy. Sexual weakness in the case of male can be overcome by the practice of asana.

**2.Sirasasanam:**

Regular practice of sirasasanam will benefit the nervous, circulatory, respiratory, digestive, excretory and endocrine system.

Sirasasanam will prevent or give relief in neurasthenia, dyspepsia, seminal weakness, spermatorhoea, varicose veins. It will prevent the enlargement of prostate gland.

**3.Savasanam:**

Savasanam is a Powerful Tranquilizer. It pacifies the body and a mind by eliminating muscular, Nervous, Mental and Emotional tension almost immediately.

**4.Bhadrasana:**

Promotes fresh Blood supply to Urogenital organs. It will effectively cure Nocturnal discharges and sexual debility.

**5.Dhanurasana:**

It gives a good massage to the abdomen and cures constipation and disorders of stomach.It activates pancreas and helps in controlling diabetes. It improves functions of the reproductive system in male and female.

**6.Paschimottasana:**

Relieves dyspepsia. Strengthens urogenital system. Fat in the waist is reduced and body gets a good shape. Insulin secretion is stimulated. Loosens all joints. Relieves back pain. Improves circulation to head and neck.

**7. Viparetha karani :**

It has all the benefits of Shirshasana and Sarvangasana. The blood circulation is increased in neck, throat and head region. Brain cells receives more supply of oxygen. Endocrine glands are stimulated. Prevents formation of wrinkles in the face and increase vitality of the body.Swelling in the legs diminish. Cures Insomnia, Back pain, Prolapse of uterus, Diabetis and Blood pressure etc. It is called as **"Sakala Roga Nivarini"** as it is curing all diseases.

**8.Parsva konasana :**

Expands the chest. Knee pain, Back pain are eradicated. Nervous system is stimulated. Impotency is corrected. Digestion and excretion are also improved.

**11. Ardha halasana :**

Digestion is improved.Liver, spleen, kidneys and reproductive organs are activated. Reduces excess fat in the abdomen. Relieves ankle, knee and thigh pain. It is helpful in constipation and diabetes.

**MUDHRAS FOR MALE INFERTILITY :**

**1.Yoga Mudra:**

Yoga Mudra tones up the pelvic organs on account of the pressure of the heels on the groins. It is useful in seminal weakness.

**2.Aswini Mudra:**

Aswini Mudra gives tone to the reproductive organs and Nerves and removes seminal insufficiency and sterility.

**PRANAYAMA:**

- It gives a feeling of freshness, energy and lightness of body and mind.
- Strengthens the lungs. Increases its capacity and cures the disorders.
- Digestion is improved.
- Excretory system is stimulated. Toxins are removed from the body.
- Skin tone is well maintained.
- All the endocrine glands are stimulated.
- It makes the nervous system more energetic .
- Pranayama can be used for therapy. Allergic rhinitis,sinusitis, recurrent infections of the upper respiratory tract, chronic headaches, migraine, peptic ulcers, anxiety states can be treated by many kinds of pranayama, without the need for asanas.
- It increases concentration and helps n meditation.

**COOLING PRANAYAMA:**

They are Cooling Pranayamas because of their cooling effect, and they help in calming down the mind by removing the mental anxiety & tension.

**MEDITATION:**

It makes the mind calm and steady.It helps us to face the battle of life. It kills the pain and sorrow. It is a powerful nervine tonic. It increases memory power. It increases social harmony. It prevents and cures all psychosomatic diseases. It provides a healthy happy, long life. It gives positive attitude towards life. It increases creativity and alertness. It helps to fight the stress successfully and quickly. It increases will power and so one is able to overcome bad habits.

**VARMA POINTS FOR MALE INERTILITY:**

¬ ñ ÁÄ Î §¿¡ö ì Ì Å÷Á ÁÕòÐÅõ :

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2.Å÷Á Òû Ç‹-§Á¡¾‹Ã Å÷Áõ
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3.Å÷Á Òû Ç‹-¿¡Â‹ÕôÒ Å÷Áõ
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ÀÂý- ¬ ñ ¨Á Ì ¨È×, «Ê ÓÐ Ì ÅÄ‹

4.Å÷Á Òû Ç‹- ã ò¾‹Ã Å÷Áõ
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5.Å÷Á Òû Ç‹- «¸ ¯Õ ¨Ç Å‹¨º ¿Ãõò Å÷Áõ
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b. Å÷Áõ-108
c. Å÷Á ÁÕòÐÅõ (º‹Èôò)

**DIET AND ADVISE :**

**Diets to be added:**

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**Vegetarian Diet:**

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â -Å¡ ¨ Æ. à ÐÅ ¨ Ç
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Å¢òÐ ì ¸ û-Óó¾¡¢,Å¡Ð ¨ Á,ÓÕ í ¨ ¸
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**Non - Vegetarian Diet:**

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**Diets to be Restricted:**

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7.§À¡¨¾ ¦À¡Õð¸û

**Patients adviced to Follow:**

- ✓ À¸ø ¯Èì¸õ Ü¼¡Đ
- ✓ À¸ø Ò½÷î º Ü¼¡Đ
- ✓ Å¡Ãõ þÕÓ¨È±ñ¨½ö Ì Ç¢Âø
- ✓ ãò¾Á¸Ç¢¨ÃÒ½÷¾ø Ü¼¡Đ
- ✓ ¦À ñ¸Ç¢¼ò¾øÁ¡¾õ´ÕÓ¨ÈÁðÎõÒ½÷¾ø §Å ñ Îõ
- ✓ À¢Ã¡½¡Â¡Áõ,¾¢Â¡Éõ, §Â¡¸¡ºÉ ÀÂ¢üº¸¨Ç §Áü¦¸¡ûÇ §Å ñ Îõ

# Modern Aspects

# MODERN ASPECTS

**Definition:**

**Infertility** is the state of being unable to produce offspring; in a woman it is an inability to conceive; in a man it is an inability to impregnate. In other words, Infertility primarily refers to the biological inability of a person to contribute to conception. Infertility may also refer to the state of a woman who is unable to carry a pregnancy to full term.

Infertility is usually defined as the inability to get pregnant after a year of unprotected sex. According to statistics collected by the Centers for Disease Control (CDC), 6.1 million women between the ages of 15 to 44 have an impaired ability to have children, and 2.1 million married couples are
experiencing infertility. The statistical study also found that 9.2 million women had made use of infertility services at some time in their life. Quite clearly, if you and your partner are facing infertility, you are not alone.

**Infertility can be of three different Types:**

**Primary Infertility:**

When a woman has never achieved conception in her life it is known as Primary Infertility.

**Secondary Infertility:**

When a woman has given birth to a child in the past but is facing difficulty to conceive again it is called Secondary Infertility.

**Recurrent Miscarriage:**

Women who experience recurrent miscarriages may also receive a diagnosis of infertility if they experience two or more successive miscarriages. While miscarriage is not uncommon (occurring in up to 25% of recognized pregnancies), less than 5% of women will experience two miscarriages in a

row, and less than 1% three or more successive miscarriages.

**Myths regarding Infertility:**

Take a look at some of the myths regarding infertility, and consider what infertility is n 1. Infertility is not limited to women.

- Infertility affects women and men equally. According to the A.S.R.M. one-third of infertility cases are due to female factor infertility, one-third are due to male factor infertility, and the remaining third due to problems from both sides, or unexplained reasons. Infertility is not all in your head.
- Infertility is a disease of the reproductive system, and is not caused by not "wanting" to have a baby enough. Infertility can not be imagined into being. If not wanting a baby was enough to cause infertility, then there would be far fewer unintended pregnancies in the world.
- Infertility is not limited to unhealthy people.
- While living a healthy lifestyle is a good place to start when trying to achieve pregnancy, it does not cure infertility. Poor diet, smoking, drinking, and STDs can threaten your fertility.
- Infertility is not limited to older couples.
- As we age, our ability to achieve pregnancy lowers. Fertility in women peaks during the late teens and 20s, after which it begins to drop, with age 35 beginning the most rapid decline. (This is why couples age 35 and older are encouraged to seek help for infertility after only 6 months of trying.) However, infertility can and does affect men and women of all ages.
- Infertility is not going to go away if you just "relax and go on vacation."
- How many times have couples coping with infertility been told, "If you just stop thinking about it, you'll have a baby." Not only is this advice incorrect, it's also hurtful. Extreme stress can disrupt a woman's menstrual cycle, but stress alone does not cause infertility.

- ❖ Ignoring infertility does not help, either. While two-thirds of couples seeking infertility treatments will get pregnant and have a baby eventually, couples with diagnosed infertility who do not receive treatment have a 5% or less chance of having a baby.

**Etiology:**

Factors relating to male infertility include:-

**Pretesticular Causes:**

a) Hypothalamic disease –Isolated gonadotrophin deficiency (kallmann's syndrome)
b) Isolated LH deficiency (Fertile eunuch")
c) Isolated FSH deficiency
d) Congenital hypogonadrotrophic syndrome
e) Haemochromatosis
f) Exogenous hormones (estrogen- androgen excess)
g) Glucocorticoid excess
h) Hyper – and hypothyroidism
i) Drugs, alcohol, smoking
j) Strenuous riding (bicycle riding, horseback riding)

**Testicular Factors:**

a) Genetic defects on the Y chromosome
b) Abnormal set of chromosomes (klinefelter syndrome)
c) Neoplasm (seminoma)
d) Cryptorchidism
e) Varicocle
f) Trauma

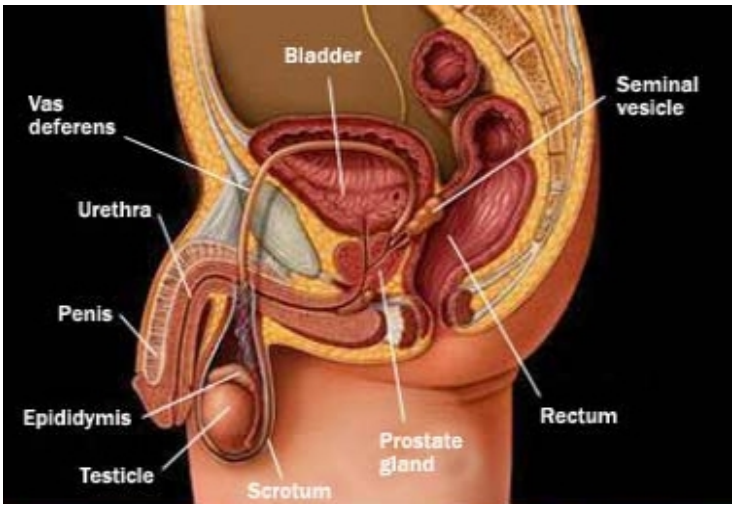
g) Hydrocele

h) Mumps

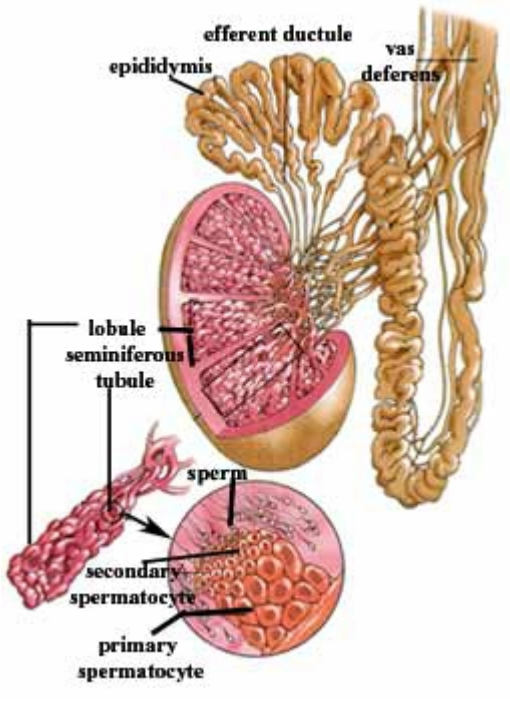
i) Malaria

j) Testicular dysgenesis syndrome

## A. MALE REPRODUCTIVE SYSTEM :



## B. INTERNAL STRUCTURE OF THE TESTIS :




## Post Testicular Causes:

a) Vas deferens obstruction
b) Lack of Vas deferens, often related to genetic markers for Cystic Fibrosis
c) Infection, e.g. prostatitis
d) Retrograde ejaculation
e) Hypospadias
f) Impotence
g) Acrosomal defect/egg penetration defect

## Anatomy of male reproductive organs:

### Testes:

The testes are the primary reproductive organs or gonads in the male. They are ovoid reproductive and endocrine organs responsible for sperm production. They are suspended in the scrotum by scrotal tissues including the dartos muscle and the spermatic cords. Average testicular dimensions are 4-5 cm in length, 2.5 cm in breadth and 3cm in anterior posterior diameter; their weight varies from 10.5- 14g. The left testis usually lies lower than the right testis. Each testis lies obliquely within the scrotum, its upper pole tilted anterio laterally and the lower posteromedially.

The testis is invested by three coats;

a. Tunica vaginalis
b. Tunica albuginea
c. Tunica vasculosa

**A.Tunica Vaginalis:**

It is the lower end of the peritoneal process vaginalis, whose formation proceeds the decent of the fetal testis from the abdomen to the scrotum. The visceral layer covers all the aspect of the testis except most of the posterior aspect. The more extensive parietal layer reaches below the testis and ascends in front of and medial to the spermatic cord. The Inner surface of the tunica vaginalis has a smooth, moist mesothelium the potential space between its visceral and parietal layers is termed the cavity of the tunica vaginalis.

**B.Tunica Albuginea:**

It is a dense, bluish white covering for the testis. It is composed mainly of interlacing bundles of collagen fibres. It is covered externally by the visceral layer of the tunica vaginalis, except at the epididymal head and tail and the posterior aspect of the testis, where vessels and nerves enter. It covers the tunica vasculosa and, at the posterior borders of the testis, project in to the testicular interior as a thick, incomplete fibrous septum, the mediastinum testis.

**C.Tunica Vasculosa:**

It contains a plexus of blood vessels and delicate loose connective tissue, and extend over the internal aspect of the tunica albuginea, covering the septa and therefore all the testicular lobules.

**Epididymis:**

The epididymis lies posteriorly and slight lateral to the testis, with vas deferens along its medial side. It has an expanded head superiorly, a body and a tail. Its overall length is 6-7 cm and it consists of the single convoluted ductus epididymis formed by the union of the efferent ducts of the testis, which attach to the rate testis. From the tail the vas deferens ascends medially to the deep inguinal ring, within the spermatic cord.

**Testicular and Epididyamal Appendices:**

At the Upper extremities of the testis and epididymis are two small stalked bodies the appendix testes and appendix epididymis. They are developmental remnants of the para meso nephric ducts (mullerian) ducts and meso nephrons respectively .

**Testicular Torsion:**

The testis and epididymis are usually fixed to their surrounding tissues. In some patients this fixation may be insufficient, a condition which allows the structures to

twist within the tunica vaginalis. This is termed testicular torsion and normally results in severe scrotal pain. Fertility may be affected by an episode of torsion.

**Seminal Vesicles:**

The two seminal vesicles are sacculated, contorted tubes locate between the bladder and rectum. Each vesicle is 5 cm long, somewhat pyramidal, the base being directed up and posterolaterally. Essentially the seminal vesicle is a single coiled tube with irregular diverticula. The coils and the diverticula are connected by the fibrous tissue. The diameter of the tube is 3-4 mm and its uncoiled length is 10-15cm.

**Vas Deferens:**

It is a muscular tube, 45 cm long, which conveys sperm to the ejaculatory ducts, and its distal continuation of the epididymis, starting at the epididymal tail. At first it is very tortuous, but it becomes straighter, and ascends along the posterior aspect of the testis. From the superior pole of the testis it ascends in the posterior part of the spermatic cord, and traverses the inguinal canal. At the internal inguinal ring the vas deferens leaves the cord, curves round the lateral side of the inferior epigastric artery. It then turns back and inclines slightly down and obliquely across the external iliac vessels to enter the lesser pelvis. It crosses the ureter and bends acutely to pass anteromedially between the posterior surface of the bladder and upper pole of the seminal vesicle. It finally descends to the base of the prostate, where it joins to the duct of the seminal vesicle at an acute angle to form the ejaculatory duct.

**Ejaculatory Ducts** The ejaculatory ducts are formed on each side by the union of the duct of the seminal vesicle with ampulla of the vas. Each is almost 2 cm in length, starts from the base of the prostate, runs anteroinferiorly between its median right or left lobes.

**Spermatic Cord:**

At the testis traverse the abdominal wall into the scrotum during early life, it carries its vessels, nerves and vas deferens with it. These meet at the deep inguinal ring to form the spermatic cord, which suspends the testis in the scrotum and extends from the deep inguinal ring to the posterior aspect of the testis. The left cord is a little longer than the right. Between the superficial ring and testis the cord is anterior to the rounded tendon of adductor longus. The spermatic cord contains the vas deferens, testicular artery and veins, cremastric artery and artery to the vas deferens, genital branches of the genitofemoral nerve, cremastric nerve and sympathetic components of the testicular plexus.

**Aberrant Ductless**:

A narrow, blind caudal aberrant ductile often occurs usually connected with the caudal part of the epididymal duct or with the start of the vas deferens.

**Paradidymis:**

The paradidymis is a small collection of convoluted tubules found anteriorly in the spermatic cord above the epididymal head.

**Scrotum:**

The scrotum is a cutaneous fibro muscular sac containing the testes and lower parts of the spermatic cords. It hangs below the pubic symphysis between the anteromedial aspects of the thighs. It is divided in to right and left halves by a cutaneous raphe, which continues ventrally to the inferior penile surface and dorsally along the midline of the perineum to the anus.

It consists of skin, dartos muscle and external spermatic, cremastric and internal spermatic fasciae. The scrotal skin is thin, pigmented and often rugose. It bears thinly scattered, crisp hairs. It has sebaceous glands, numerous sweat glands, pigment

cells and nerve endings. The left side of the scrotum is usually lower because the left spermatic cord is longer.

**Penis:**

The penis, the male copulatory organ, consists of an attached root in the perineum and a free, normally pendulous body which is completely enveloped in skin. The penile skin is remarkably thin, dark and loosely connected to the tunica albuginea. At the corona of the penis it is folded to form the prepuce or foreskins, which variably overlap the glands. The prepuce and glands penis enclose a potential cleft, the preputial sac and the two shallow fossae flank the frenulum.

**Root:**

The root of the penis consists of three masses of erectile tissue in the urogenital triangle, namely the two crura and the bulb, firmly attached to the pubic arch and the perineal membrane respectively. The crura are the posterior regions of the corpora, and the bulb is the posterior and of the corpus spongiosum.

**Body:**

The body of the penis contains three elongated erectile masses, capable of considering enlargement when engorged with blood during erection. When flaccid the penis is cylindrical, but when erect it is triangular with rounded angles.

**Corpora Cavernosa:**

The corpora cavernosa of the penis form most of the body. On the urethral surface their combined mass has a wide median groove,adjoining the corpus spongiosum.

**Corpus Spongiosum:**

The corpus spongiosum of the penis is traversed by the urethra. Near the end of the penis it expands in to a somewhat conical enlargement, the glans penis.

**Reproductive and Hormonal Functions of the Male:**

The reproductive functions of the male can be divided in to three major subdivisions:

(1) Spermatogenesis

(2) Male sexual cycle

(3) Regulation of male reproductive functions by various hormones

**Gametogenic Functions of Testes – Spermatogenesis:**

Spermatogenesis is the process by which the male gametes called spermatozoa (sperms) are formed from the primitive germ cells (spermatogonia) in the testis throughout the process of spermatogenesis the germ cells has cytoplasmic attachment with Sertoli cells. Sertoll cells supply all the necessary materials for spermatogenesis through the Cytoplasmic attachment.

**Stages of Spermatogenesis:**

Spermatogenesis occurs in four stages :

1. Stage of proliferation
2. Stage of growth
3. Stage of maturation
4. Stage of transformation.

1. **Stage of Proliferation:**

The spermatogonia near the basement membrane of seminiferous tubule are larger. Each spermatogonium contains diploid number of chromosomes (23 pairs in man) One member of each pair is from maternal origin and the other one from paternal origin .During the proliferative stage, the spermatogonia divide by mitosis without any change in chromosomal number.During this stage, the spermatogonia migrate along with sertoli cells towards the lumen of seminiferous tubule.

**2. Stage of growth:**

In this stage, the primary spermatocyte grows into a large cell. Apart from growth, there is no other change in spermatocytes during this stage

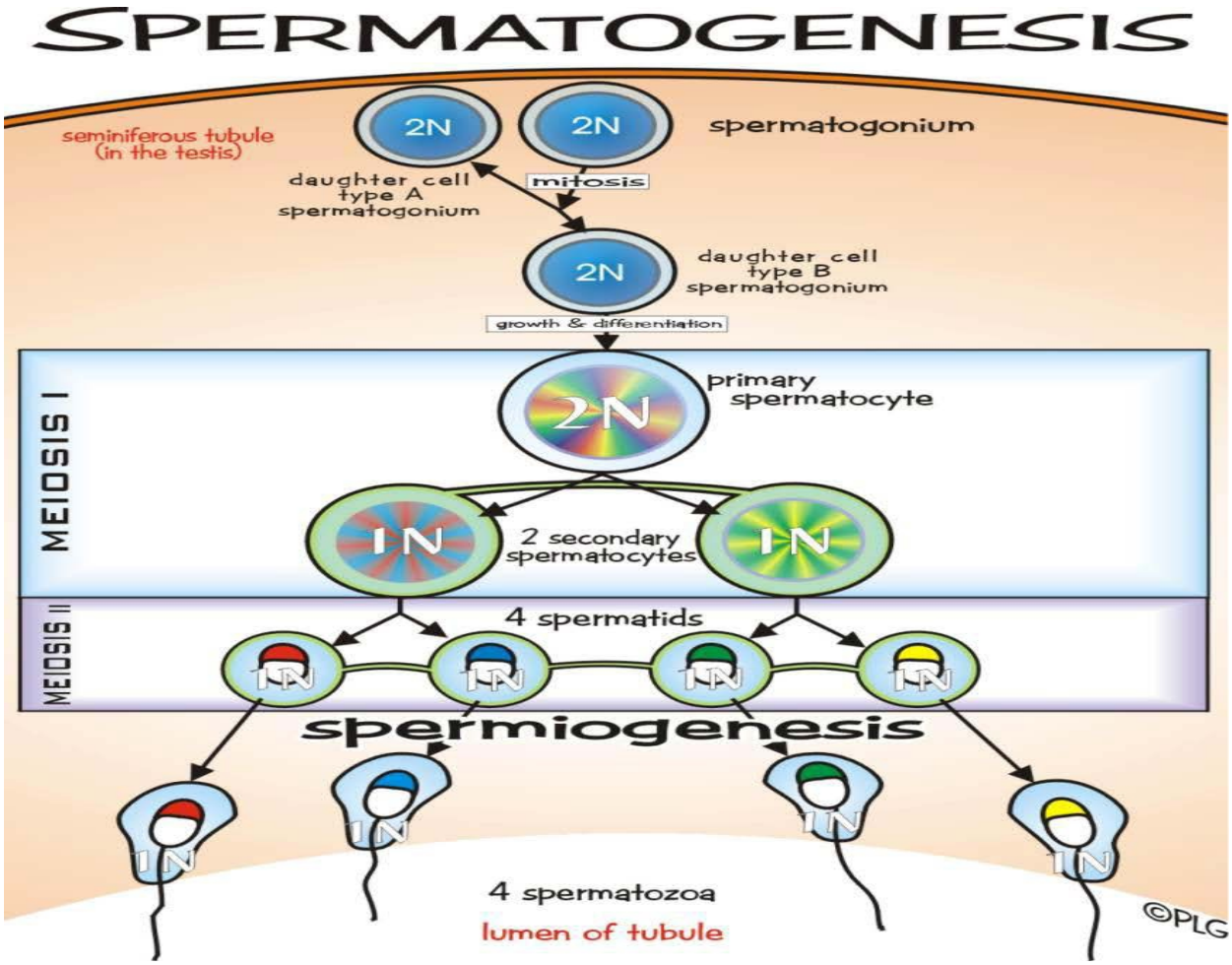
**3. Stage Maturation:**

After reaching the full size, each primary sepermatocyte quickly undergoes meiotic or maturation division, which occurs in two stages.

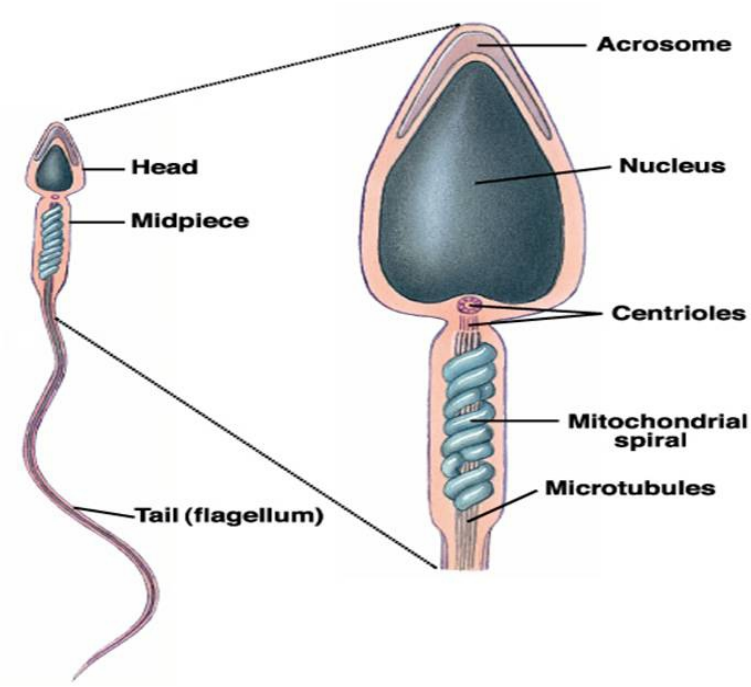
I. First stage – two secondary spermatocytes are formed

II. Second stage – each secondary spermatocyte divides into two spermatids.

## STAGES OF SPERMATOGENESIS :



## STRUCTURE OF HUMAN SPERMATOZOA :




**1. Stage of Transformation:**

The spermatids do not divide further but transform into matured sepermatozoa (sperms) by a process called spermeogenesis. The changes which take place during maturation of sperm are,

I. Condensation of nuclear material

II. Formation of acrosome. Mitochondrial spiral filament and tail structure

III. Removal of extraneous cytoplasm.

The matured sperms are released form sertoli cells into the lumen of seminiferous tubules. The process by which the sperms are released in to the lumen of seminiferous tubules. For the transport out of testis is called , spermination.

**Stage of spermatogenesis- Necessary Hormones**

1. Stage of proliferation -FSH,Growth Hormone
2. Stage of growth -Testosterone,Growth Hormone
3. Stage of maturation -Testosterone,Growth Hormone
4. Stage of transformation -Testosterone,Estrogen

**Role of Hormones in Spermatogenesis:**

Spermatogenesis is influenced by many hormones which act either directly or indirectly. The hormones necessary for spermatogenesis are,

1. Follicle stimulating hormone(FSH)
2. Testosterone
3. Estrogen
4. Luteinizing hormone (LH)
5. Growth hormone (GH)
6. Inhibin
7. Activin

**1. FSH:**

FSH is responsible for the intiation of spermatogenesis. It binds with Sertoli cells and spermatogonia and induces the proliferation of spermatogonia and induces the proliferation of spermatogonia. It also stimulates formation of estrogen and androgen binding protein from sertoli cells.

**2. Testosterone:**

Testosterone is responsible for the sequences of remaining stages in spermatogenesis. It is also responsible for maintenance of spermatogenesis. Testosterone activity is largely influenced by androgen binding protein.

**3. Estrogen:**

It is formed from testosterone in Sertoli Cells. It is necessary for spermeogenesis.

**4. LH:**

LH is essential for the secretion of testosterone from Leydig cells.

**5. GH:**

GH is essential for the general metabolic process in testis. It is also necessary for proliferation of spermatogonia. In pituitary dwarfs, the spermatogenesis is severely affected.

**6. Inhibin:**

Inhibin is a peptide belonging to transforming growth factor family. It is secreted by sertoli cells. It is also secreted in females by granulose cells of ovarian follicles. Its secretion is stimulated by FSH and inhibited by GnRH. Inhibin plays an important role in the regulation of spermatogenesis by inhibiting .FSH secretion through feedback mechanism.

**7. Activin:**

Recently the peptide called activin is also found to be secreted in gonads along with inhibin. The exact location of it is secretion in testis is not known clearly. It is suggested that secreted by leydig cells and sertoli cells. Active has opposite actions of inhibin. It increases secretion of FSH and accelerates spermatogenesis.

**Maturation of sperm in the epididymis:**

After formation in the seminiferous tubules, the sperm require several days to pass through the 6-meter long tubule of the epididymis.sperm removed from the seminiferous tubules and from the early portions of the *epididymis* are non-motile, and they cannot fertilize an ovum. However after the sperm have been in epididymis for some 18 to 24 hours they develop the capability of motility even though several inhibitory proteins in the epididymal fluid still prevent final motility until after ejaculation.

**Storage of sperm**:

The two testes of the human adult form up to 120 million sperm each day. A small quantity of these can be stored in the epididymis but most are stored in the vas deferens. They can remain stored maintaining their fertility for at least a month. During this time they are kept in a deeply suppressed inactive state by multiple inhibitory substances in the secretions of the duct. Conversely with a high level of sexual activity and ejaculations storage may be no longer than a few days. After ejaculation the sperm become motile and they also become capable of fertilizing the ovum a process called maturation the sertoli cells and the epithelium of the epididymis secrete a special nutrient fluid that is along ejaculated with sperm. This fluid contains hormones and enzymes and special nutrients that are essential for sperm maturation.

**Physiology of the Mature Sperm:**

The activity of sperm is greatly enhanced in a neutral and slightly alkaline medium as exists in the ejaculated semen but it is greatly depressed in a mildly acidic medium. A strong acidic medium can cause rapid death of sperm. The activity of sperm increases markedly with increasing temperature. Although the sperm can live for many

weeks in the suppressed state in the genital ducts of the testes. Life expectancy of ejaculated sperm in the female genital tract is only 1 to 2 days.

**Role of Sertoli Cells in Spermatogenesis:**

Sertoli cells influence spermatogenesis by four ways sertoli cells:

1. Support and nourish the germ cells.
2. provide hormonal and other substances necessary for Spermatogenesis
3. secrete androgen binding protein (ABP) which is essential for testosterone activity, particularly on spermatogenesis
4. Release the sperms in to lumen of semiferous tubeles (Spermination)

**Functions of seminal vesicle secretion:**

**Nutrition to sperms:**

The fructose and other nutritive substances from seminal vesicles are utilized by sperms after being ejaculated into female genital tract.

**Cloting of Semen:**

The fibrinogen from secretions of seminal vesicle is converted in to the coagulum as soon as semen is ejaculated.

**On Fertilization:**

The prostaglandin of seminal vesicle fluid enhances the fertilization of ovum by the following processes:

1. Increasing the receptive capacity of cervical mucosa for Sperms.
2. Causing reverse peristaltic movement of uterus and fallopian tubes. This, in turn, increases the rate of transport of sperms in female genital tract during coitus.

**Functions of prostatic fluid:**

**Maintenance of Sperm Motility:**

The prostatic fluid provides optimum pH for the motility of sperms. Generally sperms are non motile at a pH of less than 6.0. There are two factors which decrease the pH and motility of sperm:

i. Metabolic end products from sperm which make the fluid in
vas deferens acidic.

ii. Vaginal secretions in females are highly acidic with a pH of 3.0 – 4.0 The prostatic secretion neutralizes the acidity and maintain a pH of 6-6.5 .At this pH the sperm become motile and chances of fertilization are enhanced.

**Lysis of Coagulum:**

The coagulum is dissolved by fibrolysin of the prostate secretion so that the sperm become motile.

**Semen:**

SEMEN is a white or grey fluid that contain spermatozoa .It is the collection of fluid from testis, seminal vesical, prostate and bulbourethral gland.

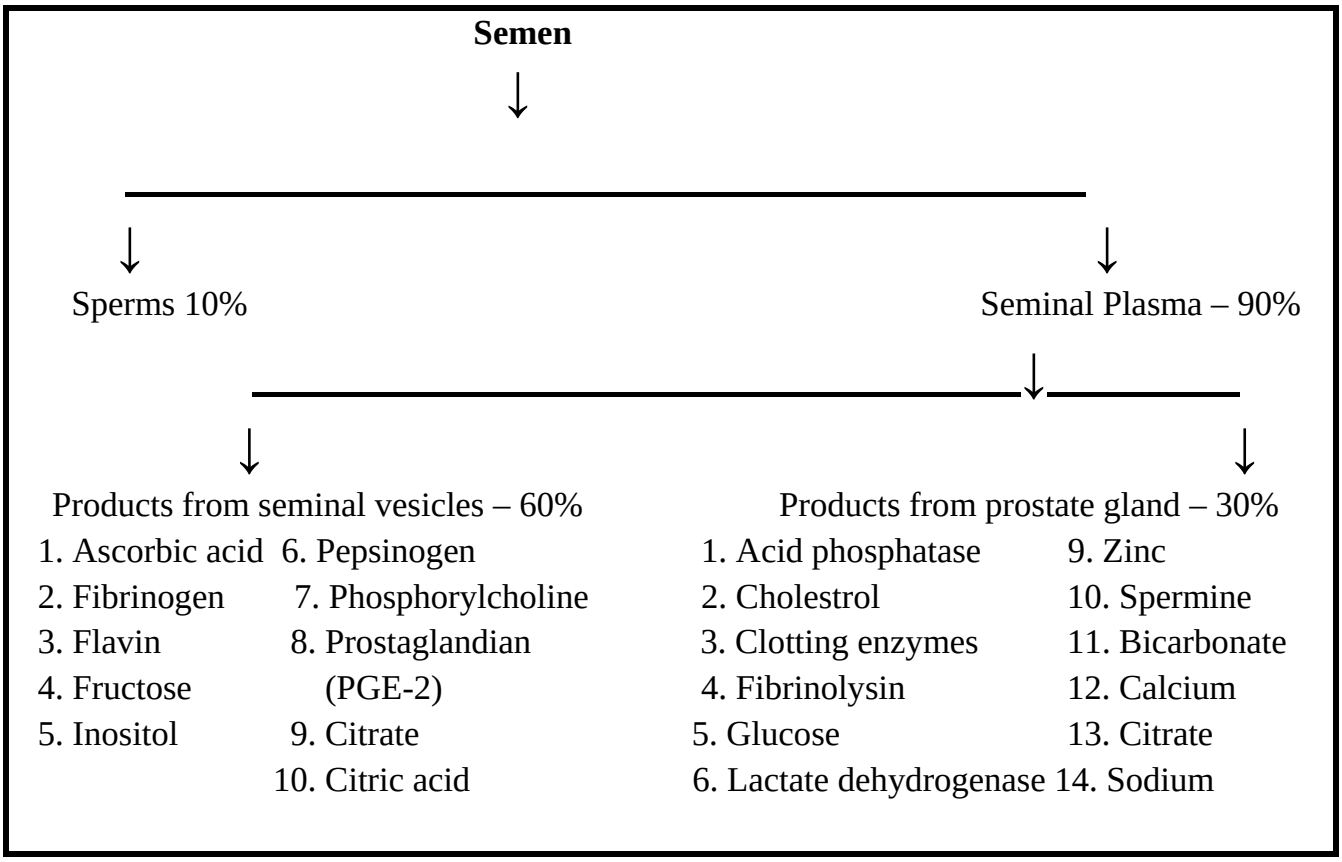
Semen is discharged during sexual act and the process of discharge is called ejaculation. At the time of ejaculation, human semen is liquid in nature.Immediately, it coagulates and some time it undergoes a secondary liquefaction.

**Properties of Semen:**

1. Specific gravity : 1.028
2. Volume : 2 to 6 ml/ejaculation
3. Reaction :

Alkaline pH of 7.5.the alkalinity is due to the secretions from prostate.

**Composition of Semen:** Semen contains 10% sperm and 90% of fluid part which is seminal plasma.




**Sperm:**

Total count of sperm is about 100 to 150 million /ml of semen. Sterility occurs when the sperm count falls below 20 million/ml. Though the sperm can be stored in the male genital tract for longer period, after ejaculation, the survival time is only about 24 to 48 hours at a temperature equivalent to body temperature.

The rate of motility of sperm in female genital tract is about 3mm/minute. The sperm reach the fallopian tube in about 30 to 60 minute after sexual intercourse. The uterine contraction during sexual act facilitates the movement of sperms.

**Capitation of the Spermation:**

Mature sperm, even when they are coming out of the male genital tract are incapable of fertilising the ovum unless the further changes or CAPITATION takes place for a variable period 1 to 10 hours in the female genital tract. The membrane of the sperm thus become progressively permeable to calcium ion that enters in abundance to initiate the powerful whiplash forward movement of the flagellum or tail instead of its previous undulating motion. Calcium has a further role to bring about further chance in the acrosome intracellular membrane for helping to releasing its enzyme very rapidly in female genital tract.

**The Acrosome Reaction:**

The lytic enzyme involved in the sperm penetration are mostly located in the anterior sperm head ,whereas other such as acrosin are primary contained within the acrosome .the anterior surface of the head needs to be removed allowing liberation of acrosin before the sperm can be penetrate zona pellucida. Removal of this anterior surface of the head is the process called acrosome reaction. An oocyte is surrounded by three layers – cumulus oophorus and corona radiate consisting of follicular cells, and the Zona pellucida, rich in glycolproteins. The perivitelline space is located between the zona pellucida and the oocyte membrane. Sperms seem to utili two mechanisms to penetrate oocytes – firstly, through its lytic enzymes in the anterior head portion, especially within the acrosome; and secondly, through its movement of the tail. Creatinine phosphokinase present in the midpiece of sperm allows the phosphokinase present in the midpiece of sperm allows the phosphorylation of creatinine and its subsequent transfer to the contractile element of the tail for its motion. Thus, all three segments of the sperms play important roles for their movement and their movement and subsequent penetration of the ovum.

**Mechanism of Erection:**

The male erectile response is a vascular event initiated by neuronal action and maintained by a complex interplay between vascular and neurological, and perhaps humoral phenomenons resulting in cascade of events. Erection of penis in simple terms consists of trapping pressurised blood within the confines of a limited space provided by the spongy corpora cavernosa. This blood – filled spaces relax and open up, allowing free inflow of blood leading to expansion of the chambers pulling the tunica albuginea tight. The tensed tunica albuginea makes the corpora hard (resistant to indentation) and rigid (resistant to flexion). Secondarily, it pinches off the veins (that normally let blood leave the chambers) trapping blood inside and contributing to the state of engorgement .The valves (actually flaps), according to some experts) that control the flow of blood, however are opened and closed by nerves that run through the spinal cord to the brain.

Activation by the nervous system causes a rapid increase in the blood flow into the penis. During erection, as blood flows into the penis, the holes in the spongy tissue in the penis get filled in with it. At the same time, flaps in the veins leading out of the penis enlarge, cutting off the outflow. Thus, more blood flows in than out, and the penis are compressed from the increased pressure from the erection itself. In addition, the heart rate and blood pressure increase the pressure of blood into the penis increases to maintain its hardness.

**Mechanism of Ejaculation:**

The emission phase is the first phase. It involves deposition of seminal fluid from the ampullary vas deferens, seminal vesicles and prostate gland into posterior urethra. The second phase is the expulsion phase. It involves closure of bladder neck.

Flowed by the rhythmic contractions of the urethra by pelvicperineal and bulbospongiosus muscle, and intermittent relaxation of external urethra sphincters.

It is believed that the neurotransmitter serotonin (5HT) plays a central role in modulating ejaculation. Several animal studies have demonstrated its inhibitory effect on ejaculation. Therefore, it is perceivged that low level of serotonin in the synaptic cleft in these specific areas in the brain could cause premature ejaculation. This theory is further supported by the proven effectiveness of selective serotonin reuptake inhibitors (SSRIs), which increase serotonin level in the synapse, in treating PE. Sympathatic motor neurons control. The emission phase of ejaculation reflex and expulsion phase is executed by somatic and autonomic motor neurons. These motor neurons are located in the thoraco lumbar and lumbo sacral spinal cord and are activated in a coordinated manner when sufficient sensory in a coordinated manner when sufficient sensory input to reach the ejaculatory threshold has entered the central nervous system.

Several areas in the brain, and especially the nucleus paragigantocellularis, have been identified to be involved in ejaculatory control.

**Male Sexual Hormone:**

Male sex hormones are called the androgens. Testes secrete three androgens:

1. Testosterone
2. Dihydrotestosterone
3. Androstenedione

Among these three androgens, testosterone is secreted in large quantities. However, dihydrotestosterone is more active.

**Source of Secretion of Androgens:**

The androgens are secreted in large quantities by testes and, by adrenal cortex in small quantities.

**Testes:**

In the testes, the androgens are secreted by the interstitial cells of leydig which form 20% of mass of adult testis, leydig cells are numerous in newborn male infant and in adult male after puberty.

**Adrenal Cortex:**

Zona reticularis of adrenal cortex also secretes androgens called testosterone, androstenedione and dehydro – epiandrosterone.

**Function of Teststerone:**

In general, testosterone is responsible for the distinguishing characters of masculine body. In the fetal life, the tests are stimulated by human chorionic gonadotropins secreted by placenta.

**Sex Differentiation in Fetus:**

Testosterone is responsible for the sex differentiation.

i. Mullerian duct which gives rise to female accessory sex organs such as vagina, uterus and fallopian tube

ii. Wolffian duct which gives rise to male accessory sex organs such as epididymis, vas deferens and seminal vesicles.

**Descent of Testes:**

Testosterone is necessary for descent of testes. Initially, testes are developed in the abdominal cavity and are later pushed into the scrotum through inguinal canal just before birth. If a male child is born with undesended testes, the condition is called ‘cryptorchidism’.

**Function of Testosterone in Adult Life:**

Testosterone has two important functions in adult,

i. Effect on sex organs

ii. Effect on secondary sexual characters

**On Sex Organs:**

Testosteron increases the size of penis, scrotum and the testes after puberty.

**On Secondary Sexual Characters:**

Testosterone causes development of secondary sexual characters atpuberty, which distinguishes the male from the male from female.

**Muscular Growth:**

One of the most important male sexual characters is the development of musculature after puberty. The mass of the muscle increases by about 50% is due to the anabolic activity of testosterone on proteins

**Bone Growth:**

After puberty the bones grow in thickness with deposition of calcium. The increase in thickness is due to increase in total content of bone matrix. The increase in bone matrix is because of protein anabolic activity of testosterone. Testosterone causes broadening of shoulders and it has a specific effect on pelvis which results in,

a) Narrowing of pelvic outlet

b) Lengthening of pelvis

c) The funnel like shape of pelvis

Pelvis in males is different from that of females,which is broad and ovoid in shape.

Testosterone also causes early fusion of epiphyses of long bones with shaft.

**Changes in Skin:**

Testosterone increases the thickness of skin over the entire body surface and the ruggedness of subcutaneous tissue. These changes in skin are due to deposition of proteins in skin.

**Hair Distribution:**

The testosterone causes male type of distribution of hair on the body. i.e hair growth over the pubis, along linea alba up to umbilicus, on face, on chest and other parts of the body like back, in males, the pubic hair has the base of the triangle downwards.

**Change in Voice:**

At puberty, testosterone causes hypertrophy of laryngeal muscles, the enlargement of larynx and lengthening and thickening of vocal cords.

**Basal Metabolic Rate:**

At the time of adolescence and earlier part of adult BMR rises 5 – 10% due to anabolic effect.

**Electrolyte and Water Balance:**

Increases sodium reabsorption from renal tubules. Sodium retention increases water retention also increases.

**Blood:**

After puberty mild increase in blood volume by increasing water content and number of RBCS

**Control of Male Sexual Functions by Hormones**

A major share of the control of sexual functions in both male and female begins with secretion of gonadotropin releasing hormone (GnRH) by the hypothalamus. This hormone in turn stimulates the anterior pituitary gland to secrete two other hormones called the gonadotropic hormones.

1. Luteinizing hormone (LH) – it is the primary stimulus for the secretion of testosterone by the testes.
2. Follicle stimulating hormone (FSH) – it stimulates spermatogenesis,

GnRH and its effects.

**Negative Feedback Control of Testosterone:**

Testosterone regulates its own secretion by negative feedback mechanism. It acts on hypothalamus and inhibits the secretion of LHRH. When LHRH secretion in inhibited, LH is not released from anterior pituitary resulting in stoppage of testosterone secretion from testes. On the other hand, when testosterone production is low, lack of inhibition of hypothalamus leads to secretion of testosterone through LHRH and LH.

**Abnormalities of sexual function:**

**Enlargement of prostate gland :**

Enlargement of prostate gland occurs due to**:**

**1.** Hyperplasia of glandular structures and connectivity tissuesbenign (non-malignant) enlargement

**2.** cancer – malignant enlargement

The benign enlargement occurs in some men after the age of 60 years of age due to unknown causes. The enlarged prostate stretches a urethra and obstruct urine out flow from the bladder the common symptoms as increase in the frequency of urination difficulty in urination dribbling of urine after urination, occasional renal failure. Malignant enlargement of prostate gland also causes obstruction of urinary passage.

**Hypogonadism in Males:**

Hypogonadism is a condition characterized by reduction of functional activity of gonads.

**Signs and Symptoms:**

The clinical picture of male hypogonadism depends upon whether the testicular deficiency develops before or after puberty.

**Before Puberty:**

The features of hypogonadism are due to extirpation of before puberty.

**After Puberty**:

The symptoms are due to removal of testes after puberty.

**In adult:**

Hypogonadism caused by testicular disorder increases the gonadotropin Secretion and the condition called hypergonadotropic hypogonadism.

Hypogonadism that occurs due to deficiency gonadotropin is called hypogonadotropic hypogonadism.

**Frohlichs Syndrome:**

It is the disorder characterized by obesity and hypogonadism in adolescent boy also called adiposo genital syndrome or hypothalamic eunuchism.

**Effect of Temperature on Spermatogenesis:**

Increasing the temperature of the testes can prevent spermatogenesis by causing degeneration of most cells of the seminiferous tubules besides the spermatogonia. It has often be stated that the reason the testes are located in the dangling scrotum is to maintain the temperature of these glands, below the internal temperature of the body, although usually only about 2º C below the internal temperature. On cold days scrotal reflexes cause the musculature of the scrotum to contract, pulling the testes close to the body to maintain this 2º C differential. Thus the scrotum theoretically acts as a cooling mechanism for the testes.

**Cryptorchidism:**

Cryptorchidism means failure of the testis to descent from the abdomen in to the scrotum at or near the time of birth of a fetus. During development of them male fetus, the testes are derived from the genital ridges in the abdomen. However, at about 3 weeks to 1 month before the birth of the baby, the testes normally descent through the inguinal canals in to the scrotum. A testis that remains throughout the life in the

abdominal cavity is incapable of forming sperm. The tubular epithelium undergoes degeneration, leaving only the interstitial structures of the testis.

**Semen analysis:**

**Collection:**

The semen specimen should be collected in a small clean wide mouthed jar of 10 to 20 ml (using larger jar may cause drying of some portion, when it is transported to the laboratory). The container must be spotlessly clean. Masturbation (self-stimulation) is the most preferred method. Coitus interrupts (withdrawal of penis just prior to ejaculation during sexual intercourse) may be used, but there is always a possibility of loss of the sperm rich initial portion. The container must be ideally warmed to the body temperature, as sperms are especially susceptible to cold.

The slide must be warmed, as otherwise motility studies may show erroneous result. Masturbation can be very stressful for some men especially when they know their counts are low, or if they have had problems with masturbation on demand for semen analysis in the past. The condition of the toilet room, where the patient has to go for procuring the specimen, is often related to their not providing the proper specimen. Men failing to provide a specimen could be advised either to have female partners beside or to see sexually arousing pictures for helping them to provide sample. They can also use a mechanical vibrator to get an erection.

In some cases, additional assistance by using liquid paraffin helps in masturbation. The infertility centres should have a special private room to allow the patients for the masturbation on demand.

The semen samples must be collected after a sexual abstinence 3 to 5 days, or at least 72 hours after the last ejaculation (no sex or masturbation). It is very important to keep with the chosen abstinence schedule, because variations in the time period between ejaculations interfere with the accuracy of test results. For up to one week, semen characteristics, such as volume and sperm concentration, may increase with each day of abstinence; but after that period, the sperm motility is usually impaired.

**Components of Semen Analysis:**

- Sperm count
- Motility
- Morphology
- Volume
- Fructose level
- pH

**Sperm Count:**

Sperm count, or *sperm concentration* to avoid mix-up, measures the concentration of sperm in a man's ejaculate, distinguished from *total sperm count*, which is the sperm count multiplied with volume. Anything over 20 million sperm per milliliter is considered normal. Anything less is considered 'oligospermia'. The average sperm count today is around 60 million per milliliter in the Western world, having decreased by 1-2% per year from substantially higher number decades ago.

**Motility:**

A more specified measure is *motility grade*, where the motility of sperm is divided into four different grades:

- **Grade 4**: Sperm with progressive motility. These are the strongest and swim fast in a straight line. Sometimes it is also denoted motility **a**.
- **Grade 3**: (non-linear motility): These also move forward but tend to travel in a curved or crooked motion. Sometimes also denoted motility **b**.
- **Grade 2**: These have non-progressive motility because they do not move forward despite the fact that they move their tails.
- **Grade 1**: These are immotile and fail to move at all.

**Morphology:**

i. Head - The head should be oval and smooth.

ii. Mid piece - the mid piece should be straight and slightly thicker than the tail.

iii. Tail - the tail should be single, unbroken, straight and without coils.

**Volume:**

The volume of the sample is measured between 1.0 mL and 6.5 mL is normal; WHO criteria specify that any volume greater than 2.0 mL is normal. Low volume may indicate partial or complete blockage of the seminal vesicles, or that the man was born without seminal vesicles. In clinical practice, a volume of less than 2 mL in the setting of infertility and absent sperm should prompt an evaluation for obstructive azoospermia.

**Fructose level:**

The normal level of fructose in the semen is at least 3 mg/ml. WHO specify a normal level of 13 μmol per sample. Absence of fructose may indicate a problem with the seminal vesicles.

**pH:**

The normal range of pH of the sample is 7.1-8.0; WHO criteria specify normal as 7.2-7.8. Acidic ejaculate (lower pH value) may indicate one or both of the seminal vesicles are blocked. A basic ejaculate (higher pH value) may indicate an infection. A pH value outside of the normal range is harmful to sperm.

**Liquefaction:**

The liquefaction is the process when the gel formed by proteins from the seminal vesicles is broken up and the semen becomes more liquid. It normally takes less than 20 minutes for the sample to change from a thick gel into a liquid. An abnormally long liquefaction (more than 30 minutes) time may indicate an infection.

**Total motile spermatozoa:**

*Total motile spermatozoa* (TMS) or *total motile sperm count* (TMSC) is a combination of sperm count, motility and volume, measuring how many million sperm cells in an entire ejaculate are motile. Use of approximately 20 million grade 3+4 sperm in ICI, and 5 million ones in IUI may be an approximate recommendation.

**Others:**

The sample is tested for white blood cells. A high level of white blood cells (over 1 million per milliliter) may indicate an infection.

***Abnormalities:***

i. Aspermia: absence of semen
ii. Azoospermia: absence of sperm
iii. Oligospermia: low number of sperm
iv. Asthenozoospermia: poor sperm motility
v. Teratozoospermia: sperm carry more morphological defects than usual.

**Advanced sperm fertility testes:**

**Computer-assisted semen analysis (casa)**

The new technologies such as CASA incorporate the video systems to measure the types and the speed of sperm motility. Normal sperms swim faster and straighter than the abnormal ones. The average speed of a human sperm is roughly 48 to 96mm per second. CASA permits the measurement of additional motility parameters such a curvilinear velocity (VCL), straight-line velocity (VSL), linearity, and flagellar beat frequency. CASA Measures the parameters such as VCL, VSL and amplitude of lateral head (ALH). The quality of sperm movement is based on a classification system of 0 to 4, wherein 0 represents no movement and 4 represents excellent forward progression; for example, a semen sample with 60% motility would be characterized as 3+ to 4.2.

**Quality Assessment of Casa:**

Three levels of quality assessment are generally accepted: structure, process and results.

**Sperm Clumping or Agglutination:**

The sperms may clump head-to-head, tail-to-tail, or head-to-tail. In particular tail-to-tail agglutination of motile sperm is noteworthy and usually is followed up with Sperm Function

**Semen Culture Test:**

In a semen culture test, the semen sample is tested for the presence of bacteria. Testing the bacterial sensitivity to antibiotics is mandatory if there is any presence of bacteria. Whether the bacteria present in the specimen are that are usually seen in normal semen or those of a bacterial disease, Without the evidence of inflammation or infection, there is no indication there is no indication for routine culture or antibiotic treatment in infertile men. If urine analysis is abnormal or bacterial prostatitis is suspected from the history or the physical examination, semen culture is certainly indicated. The common sexually transmitted organisms such as Chlamydia trachomatis, Mycoplasma hominus and Ureaplasma urealyticulum have been implicated in reproductive failure in animals and humans.

**Biochemical Tests:**

Biochemical analysis of seminal plasma mostly provides insights into the function of the accessory sex glands. The fructose content of semen (normal value -250-400 mgm or 4-28 mmol/litre) should be routinely tested. Low fructose content (less than 120 mgm) is often due to seminal vesiculitis, androgen deficiency or partial ejaculatory

duct obstruction. Its absence indicates complete obstruction either due to a congenital block at the level of ejaculatory duct or proximal to it like agenesis of the vas and the seminal vesicle or following acquired post-infective cicatrisation.

Almost invariably, these conditions are associated with azoospermia or severe oligospermia.

The epididymis is represented by glyceryphosphorylcholine (GPC), the seminal vesicles by fructose, and the prostate gland by zinc.

**Immunological Tests:**

In the enzyme-linked immune sorbent assay (ELISA) test, the antisperm antibodies measuring up to 20 units/m in 32 or 64 dilutions is considered normal.

**Sperm Function Tests:**

The sperm function tests assess the sperm's ability to fertilize the ovum. There is a drawback that these tests are often not standardized adequately.

**Sperm Viability or Sperm Survival Test:**

The sperm viability may be determined by two methods-Eosin Y stain exclusion and hypo-osmotic swelling or HOS assay.

**Bovine Cervical Mucus Test:**

The bovine cervical mucus test is another form of testing for the ability of the sperms to penetrate and swim through cervical mucus. These tests to assess the fertilizing potential of sperms. This in vitro functional test measures the ability of penetration of the sperms. The end point of this assay is penetration of the ovum and decondensation of sperm heads. Men with sperm of low SPA score are less likely to achieve a spontaneous pregnancy than those with high SPA score.

**Sperm Chromatin Structural Assay (Scsa):**

To measure the level of DNA fragmentation in the sperm and to help the diagnosis and treatment for male infertility. The sperm with high levels of DNA

fragmentation have a lower probability of producing a successful pregnancy. Vitamin C protects the sperms from endogenous oxidative DNA damage that could affect sperm quality and increased risk of genetic defects, particularly in population with low ascorbic acid (like smokers against free radical damages. 24 Studies show that a daily dose of 1000 mg showed statistically significant improvement of sperms .

**The Postcoital Test (Pct):**

It is first performed by Sims more than 125 years ago, has traditionally been a common way to determine cervical mucus/sperm interaction. This test evaluates sperm concentration and motility in an aspirate of cervical mucus at midcycle shortly after the couple has intercourse. Results of a normal PCT would show the presence of 20 or more spermatozoa per high-power field. An abnormal PCT results most commonly is secondary to inappropriate timing of coitus. Other causes include ASA, an ovulation, an abnormal hormonal milieu, female or male genital tract infections, poor semen quality, and male sexual dysfunction. Because this test relies heavily on factors that are beyond the control of the clinic, the usefulness of the PCT in infertility investigation has been questioned. Whereas the presence of motile spermatozoa indicates that spermatozoa can survive in the cervical mucus, failure to find motile spermatozoa is more difficult to interpret Tests that investigate the *in vitro* interaction between spermatozoa found in semen and sperm-free midcycle mucus are also clinically useful. *In vitro* tests, such as the capillary test, were introduced in an attempt to standardize the sperm-mucus penetration capacity. The crossed mucus-hostility assay, which uses donor spermatozoa and mucus as controls, is utilized to determine if it is the male or female partner who is responsible for poor sperm-cervical mucus interaction. Recently, a commercial assay (Penetrak test) has been developed using bovine cervical mucus that is similar to human cervical mucus both biochemically and physiologically. However, this assay does not assess the female component of the cervical factor. The Tru-Trax Assay (Humagen) combines both approaches, placing human and bovine cervical mucus in adjacent walls. There is also

disagreement of whether these assays correlate with one another, with motility and other semen variables. It is likely that the cervical mucus penetration test measures a sperm function that is independent of other sperm functions measured.

**Sperm Penetration Assay (Spa):**

The SPA was developed to measure the functional properties of sperm and was initially developed following the observation that, upon the removal of the zona pellucida of hamster ova, the species specificity of fertilization and the block to polyspermy are lost. In particular, heterologous penetrations between hamster ova and sperm from a variety of species, including humans, has been observed. Ideally, human ova should be used for this assay, but they are not widely available, and there are ethical problems associated with their use. Therefore, hamster ova have provided a useful model for the measurement of human sperm function.

For fertilization to occur *in vivo*, the sperm must first be capacitated and have undergone the acrosome reaction. The physiology of sperm capacitation is not clearly defined. In particular, it is not known whether capacitated sperm that have gained the ability to penetrate human ova have undergone the acrosome reaction, or whether this occurs as a local event at the time of gamete fusion.

The use of SPA as a measure of potential fertility is based on the theory that fertile sperm samples will either penetrate most hamster ova or result in a significant amount of polyspermy of the penetrated ova. Infertile sperm samples are expected to penetrate a lower percentage of ova or result in a lesser degree of polyspermy.

Consideration should be given to obtaining the SPA in couples with unexplained infertility or in couples in whom the decision is being made to precede with intrauterine insemination (IUI) or IVF, since lower SPA results have been predictive of poor success with IVF and lower pregnancy rates in couples attempting conception through intercourse.

**Reactive Oxygen Species (Ros) Assay:**

For cells living under aerobic conditions, oxygen represents a paradox: While it is required for survival and normal function, its metabolites can be potentially toxic due to the generation of oxygen-free radicals. Some of these metabolites, called ROS, have been shown to be produced by spermatozoa and to generate toxic effects on sperm function. However, when produced at the right time and amount, these ROS can also initiate and promote normal physiologic reactions such as sperm hyperactivation and capacitation. In human semen, high ROS formation was detected in 40% of semen samples from an unselected population of men consulting an infertility clinic.

**Nutrition:**

**Zinc:**

Zinc is the most important nutrient mineral influencing male fertility. Zinc level in the seminal plasma is directly related to sperm motility. Dietary zinc restriction reduces both sperm count and seminal plasma volume. Zinc levels in seminal plasma of normal, oligospermic, asthenospermic and azoospermic subjects show that a linear direct relationship seems to exist between zinc in seminal plasma and motility of spermatozoa. Dietary restriction of zinc can affect testicular function adversely. This is the effect of zinc deficiency. The serum testosterone concentration and seminal volume are most sensitive to zinc depletion in men in the reproductive period.

**Vitamin B 12:**

Vitamin B 12 deficiency also plays a role in fertility. “Intrinsic factor” is necessary for the proper absorption of B12 and its deficiency is one of the causes of secondary infertility in male.

**Vitamin C :**

Studies have shown the concentration of ascorbic acid in seminal plasma directly reflects dietary intake, and lower levels of vitamin C may lead to infertility and increased damage to the sperm's genetic material.36 Fraga et al demonstrated this by reducing ascorbic acid intake in healthy men from 250 mg to 5 mg per day. Seminal plasma levels of vitamin C decreased by 50 percent, with a concomitant 91-percent increase in sperm with DNA damage

**L-arginine:**

The biochemical and physiological relevance of L-arginine lies in its role as the precursor in the synthesis of polyamines and testosterone. The polyamines putrescence and spermidine are organic components important to sperm motility. Arginine metabolisms is a factor in normal sperm production being involved as a source of nitric oxide within spermatozoa. Nitric oxide (at endogenous concentrations) appears to be necessary for adequate sperm motility. The endothelial (eNOS) and brain (b NOS) nitric oxide syntheses are abundant in normozoospermic samples but is low in asthenozoospermic patients. Consequently, an adequate dietary amount of Larginine is necessary for normal spermatogenesis, especially for the sperm motility and arginine aspartate (9 g daily) has been found to be effective in some cases of asthenospermia. L-arginine, 4 gm daily has been shown to improve sperm counts in men with oligospermia. Nuts, oilseeds, flesh foods, pulses and legumes are common sources of L-arginine.

**Vitamin E:**

The membranes of the germ cells and spermatozoa are very sensitive to oxidation because of their high content of PUFA (Polyunsturated fatty acids).Vitamin E is a major lipophilic chain-breaking anti oxidant, which protects tissue PUFA against peroxidation, a property that is beneficial in the male reproductive physiology. Oral

administration of vitamin E significantly improves the in vitro function of human spermatozoa as assessed by the zonabinding test. Vitamin E antioxidant therapy is however, dependent on the dosage or the in vitro concentration of the vitamin. Vitamin E in a dose of 200 IU twice daily acts an antioxidant and improves sperms' ability to impregnate.

**Selenium:**

Men with reduced sperm motility, supplementation with selenium (100 mcg per day for three months) significantly increased sperm motility, but it had no effect on sperm count. Selenium is one of the important ingredients that is very often lacking in order mean and can be found in horsetail, which has been used with success in ED following prostatic enlargement.

**L- Carnitine:**

Sperm motility also increased both in quantitative and qualitative manners. In a multicentric study, increase in the sperm motility was also observed in terms of both rapid linear progression and linearity index along with that the sperm output after oral administration of L -carnitine in patients with idiopathic asthenozoospermias. Two amino acids Iysine and methionine that is necessary for the biosynthesis of L-carnitine in the body.

**Antioxidants :**

Polyunsaturated fatty acids and phospholipids are key constituents in the sperm cell membrane and are highly susceptible to oxidative damage. Sperm produce controlled concentrations of reactive oxygen species, such as the superoxide anion, hydrogen peroxide, and nitric oxide, which are needed for fertilization; however, high concentrations of these free radicals can directly damage sperm cells. Disruption of this

delicate balance has been proposed as one of the possible etiologies of idiopathic male infertility. About some Anti-oxidants,

- Vitamin A alone improved sperm function and IVF rates in studies.
- Vitamin A, Vitamin E, and essential fatty acids (omega-3 fats) were shown to increase sperm count in another study.
- Folic acid and zinc may increase sperm concentration.
- The bottom line: having a healthy diet is important for male fertility. If you are having trouble conceiving, re-evaluate your diet. You should have a diet rich in a variety fruits and vegetables and take a good quality multivitamin daily. You may also consider taking an omega-3 supplement, if your intake of fish is low.

**Coenzyme Q-10 :**

In sperm cells, coenzyme Q10 (CoQ10) is concentrated in the mitochondrial mid-piece, where it is involved in energy production. It also functions as an antioxidant, preventing lipid peroxidation of sperm membranes. When sperm samples from 22 asthenospermic men were incubated *in vitro* with 50 microM CoQ10, significant increases in motility were observed. CoQ10 (60 mg) was given to 17 infertile patients for a mean 103 days, and although there were no significant changes in standard sperm parameters, there was a significant improvement in fertilization rate ($p<.0.05$).52 In another study, 10 mg/day of coenzyme Q7 (an analog of CoQ10) was given to infertile men, with resulting increases in sperm count and motility.

**Normal Values - WHO Criteria:**

The WHO reference values for a normal semen analysis are defined as given below:

- Volume – 2 ml or more
- Total sperm count - 40 millions per ejaculate or more
- Sperm concentration - 20 millions per ejaculate or more
- PH – 7.2 or higher
- Motility - 50 % or more motile
- 25% or more with progressive motility, within 60 minutes of ejaculation

Motility is graded from a to d according to WHO manual criteria,

- ✓ a – Fast progressive.

  Sperms are those which swim forward fast in a straight line, like guided missiles
- ✓ b – Slow progressive.

  Sperms swim forward, but either in a curved or crooked line or slowly.
- ✓ c – Non progressive.

  Sperms move their tails, but do not move forward. ( local motility only )
- ✓ d – Immotile.

  Sperms do not move at all.

  Sperms of grade c & d are considered poor.

**Morphology:**

- Head - The head should be oval and smooth.
- Mid piece - the mid piece should be straight and slightly thicker than the tail.
- Tail - the tail should be single, unbroken, straight and without coil.

# Trial drugs

# LITERATURE REVIEW OF TRIAL DRUGS

## இசப்புகோல் :

**Botanical Name :Plantago ovata**

**Family : Plantaginaceae**

À.¯ :Å¦¨¾

¦ºö¨¸:

- ¯ÃÁ¡ì¸¦ (Tonic)
- º¦Ú¿÷ ¦ÀÕì¸¦ (Diuretic)
- ¯ûÇÆÄ¡üÈ¦ (Demulcent)
- ÅÈðº¦Â¸üÈ¦ (Emollient)

**Ì½õ (properties) :**

- **Commonly used as good LAXATIVE.**
- **One very good & easy way to retain fertility in men is to use ISABGOL .**

## சாதிக்காய் :-

**Botanical Name : Myristica fragrans**

**Family : Myristicaceae**

À.¯ :¸¡ö

Í¨Å :ÐÅ÷ôÒ,¸¡÷ôÒ

¾ý¨Á :¦ÅôÀõ

À¦¡¦× :¸¡÷ôÒ

¦ºö¨¸:

- ¦ÅôÀÓ ñ ¼¡ì¸¢ (Stimulant)
- Á ñ ã ðÊ (Aromatic)
- ¸¡Áõ¦ÀÕì¸¢ (Aphrodisiac)
- ¯ÃÁ¡ì¸¢ (Tonic)
- «¸ð Î Å¡öÅ¸üÈ¢(Carminative)
- ã÷î ¨ºÔ ñ ¼¡ì¸¢(Narcotic)

¾¡Ð ¿õ¼õ §À¾¢ ºÕÅ¡º¢Âõ º¢Ã §¿¡ö
µÐ ÍÅ¡ºõ¸¡ºõ ¯ð¸¢Ã¡½¢-§Å§¾¡
ÊÄì¸¡ö ÅÕõÀ¢½¢§Å¡õ ²üÈÁÂø À¢ò¾õ
Ì Äì¸¡ö ÂÕóÐÅ÷ì Ì Ü Ú.

- «ò¾Â÷ Ì ½Å¡¸õ
(Ì ½À¡¼õ Àì¸õ ± ñ :430)

**Ì ½õ (properties) :**

- **It acts as an aphrodisiac by stimulating the central nervous system.**
- **It has a tranquilizing effect that helps to avert premature ejaculation.**

**<u>நீர்முள்ளி விதை :-</u>**

**Botanical Name :Hygrophila spinosa**

**Family : Hygrophilaceae**

À.¯ :¦ºÊ,â,Å¢¨¾

Í¨Å :þ É¢ôÒ,º¢Ú ¨¸ôÒ

¾ý¨Á :¾ðÀõ

À¢¡¢× :þ É¢ôÒ

¦ºö¨¸:

- º¢Ú¿÷ ¦ÀÕì¸¢ (Diuretic)
- ¸¡Áõ¦ÀÕì¸¢ (Aphrodisiac)

Å¢óÐ×Á¡õ ¾¡Ð×Á¡õ §Á¸§Ã¡¸õ ¦¾¡ ¨ÄÔõ
¯óÐ Á¾ºÃõ ´Æ¢Ôõ¸¡ ñ -ÅóÐ¼Ä¢ø
²È¢Â É÷ Å¢ì¸õ ±È í Ìõ þ ¨ ÇôÒÁÚõ
ÜÈ¢Â ¿÷Ó ûÇ¢ Å¢¨¾ì Ì.

- «¸ò¾Â÷ Ì½Å¡¸¼õ
(Ì½À¡¼õ Àì¸õ ± ñ :587)

**Ì½õ (properties) :**

- **It has aphrodisiac and spermatogenic effect against infertility may be due to hormonal and neurohumoral changes, which play an important role in the sexual behaviour and fertility disorders.**

**கற்கண்டு :**

**Botanical Name :Sacchrum officinarum**

**Family : Poaceae**

Í ¨Å :þ É¢ôÒ
¾ý ¨Á :¾ðÀõ
À¢¡¢× :þ É¢ôÒ

®È¢ý ¾Êôõ Á¢ÕÁÖõÀø Å¡ó¾¸ Ùõ
º¢Ú¸À ÓðÊÉÓõ §ºÃ¡§¾ - §¾È¢Â
¦º¡ü¸ ñ ÊÇõ Ì Â¢ø¸û ÝÆ Á¼Å§É!
¸ü¸ ñ ¦¼½×¨Ãì Ìõ ¸¡ø.

- «¸ò¾Â÷ Ì½Å¡¸¼õ
(Ì½À¡¼õ Àì¸õ ± ñ :238)

## DRUGS OF ISABGOL CHOORANAM :

ISABGOL VITHAI

NEERMULLI VITHAI

SATHIKKAI

PANAM KARKANDU

# Materials & Methods

# MATERIALS & METHODS

# PROTOCOL

**Introduction:**

The clinical trial for male infertility was decided to be conducted as an open label study.

**Data Collection:**

Literary evidence from various,

- Siddha books
- Medical journals
- Internet

**Trial Spot:**

The entire study was conducted on patients attending the OPD of Government Siddha Medical College, Aringnar Anna Hospital of Indian Medicine campus, Arumbakkam, Chennai-106, during the period 2011-2012.

**Population:**

The population consists of male infertility patients [sperm concentration less than 45 millions/ml (or) sperm motility below 50%] satisfying the inclusion and exclusion criteria mentioned below.

**Inclusion Criteria:**

- Age 21 – 45 years
- Oligospermia (low number of sperm)
- Asthenozoospermia (poor sperm motility)
- Teratozoospermia(sperm carry more morphological defects than usual)
- Oligo astheno teratospermia
- Willing to give semen for the investigation

**Exclusion Criteria:**

- Azoospemia
- Hydrocele & Varicocele
- Diabetes mellitus
- Hypertension
- Cardiac diseases

**Duration of Treatment :**

60 to 90 days.

Patients were followed under the guidance and supervision of the HOD,Professor, Reader, Lecturer and Asst. Lecturer of the Maruthuvam, P.G.Department, GSMC, Chennai-106.

20 patients were selected and carefully studied for their history, clinical examinations, investigations and management.

**Evaluation of Clinical Parameters:**

The history includes past, personal, family, occupation, dietary habits, seasonal history, and associated history.

**Clinical Investigations :**

**Blood :-**

TC (cells /cu mm)
DC (%),
ESR (mm)
Hb (gms%)
Sugar
VDRL
Urea
S.Creatinine
S.Cholesterol

**Urine:-**

Albumin
Sugar
Deposits

**Semen Analysis:**

Volume
Colour
Appearance
Viscosity Liqufication time
Sperm Concentration (millions/ml)
Motility (%)
Morphology (%)

**Siddha Assessments :**

- ✓ Envagai thervugal
- ✓ Neerkuri
- ✓ Neikkuri

A case sheet format was prepared on the basis of the Siddha methodology example **envagai thervvugal, mukkutram, nilam, kaalam, udal thathugal, including neerkuri and neikuri.** Individual case sheet was maintained for each patient at outpatient department.

## TRIAL MEDICINES

### Drug Name : Isabgol Chooranam

**Text reference: Koshayi Anuboga Vaidhya Bramma Ragasiyam , page no :108**.

**Ingredients:**

- ❖ **Isabgol - 1 part**
- ❖ **Sadikkai -2 part**
- ❖ **Neermulli vithai -2 part**
- ❖ **Karkandu -6 part**

**Procedure:**

All the drugs were dried well in shadow and made into fine powder. And they were put in a bottle and mixed thoroughly.

**Dosage:**

1 gm, 2 times daily with cow's milk after meals.

**Indications:**

- ❖ Aphrodisiac

**ISABGOL CHOORANAM**

# Results & Observations

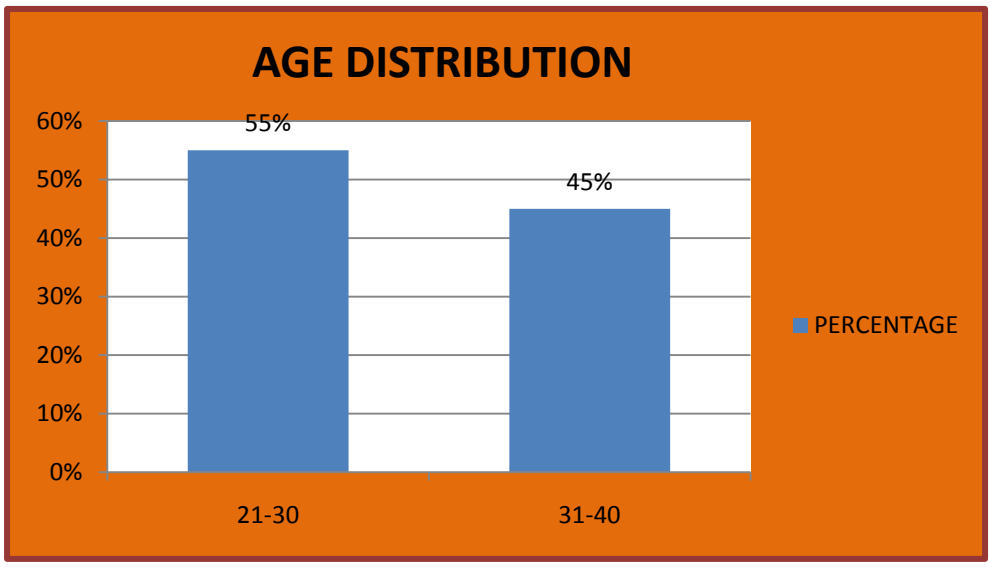
# RESULTS AND OBSERVATIONS:

The factors considered for the purpose of the study comprised of the following:

- Age Distribution
- Thinai
- Paruva kaalam
- Occupational status
- Socio economic Status
- Food habits
- Personal habits
- Symptoms
- Classifications of results according to Vali, Azhal & Iyyam
- Udal kattugal
- Enn vagai thervu
- Naadi
- Classification on the basis of Neikkuri
- Clinical progress
- Results after treatment.

**Age Distribution:-**

| Sl.NO | Age | No.of patients/20 | Percentage |
|---|---|---|---|
| 1. | 21-30 | 11 | 55% |
| 2. | 31-40 | 9 | 45% |

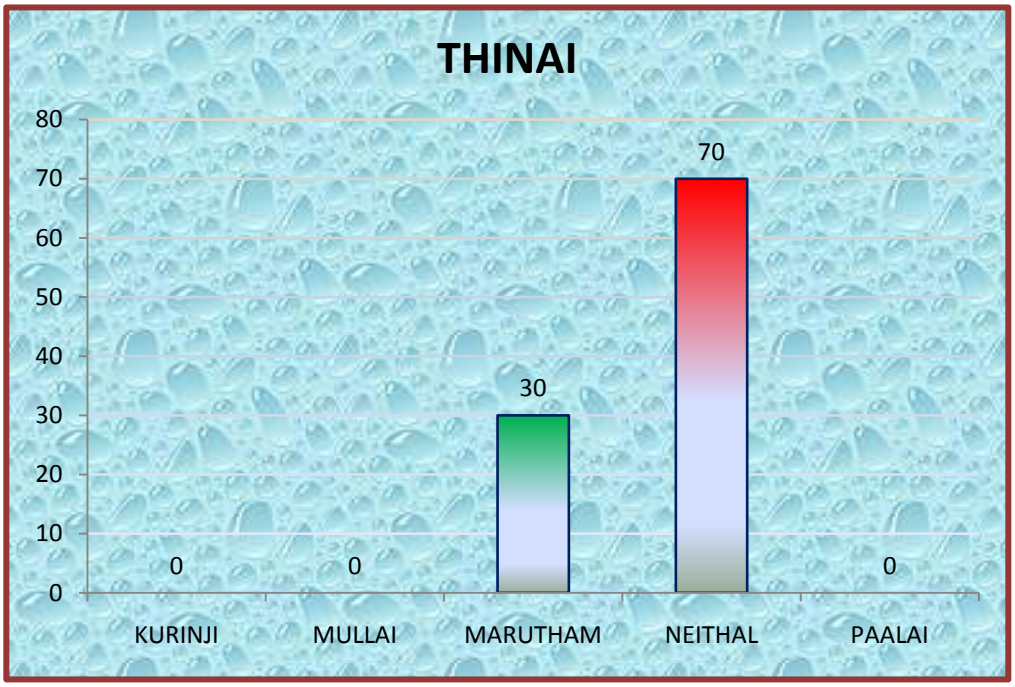



**Inference:**

**According to the above mentioned data 55% of patients were in age groups 21-30 years, 45% of patients were in age group 31-40 years.**

**Thinai:**

| Sl.No | Thinai | No.of patients/20 | Percentage |
|---|---|---|---|
| 1 | Kurinji | 0 | 0% |
| 2 | Mullai | 0 | 0% |
| 3 | Marutham | 6 | 30% |
| 4 | Neithal | 14 | 70% |
| 5 | Paalai | 0 | 0% |

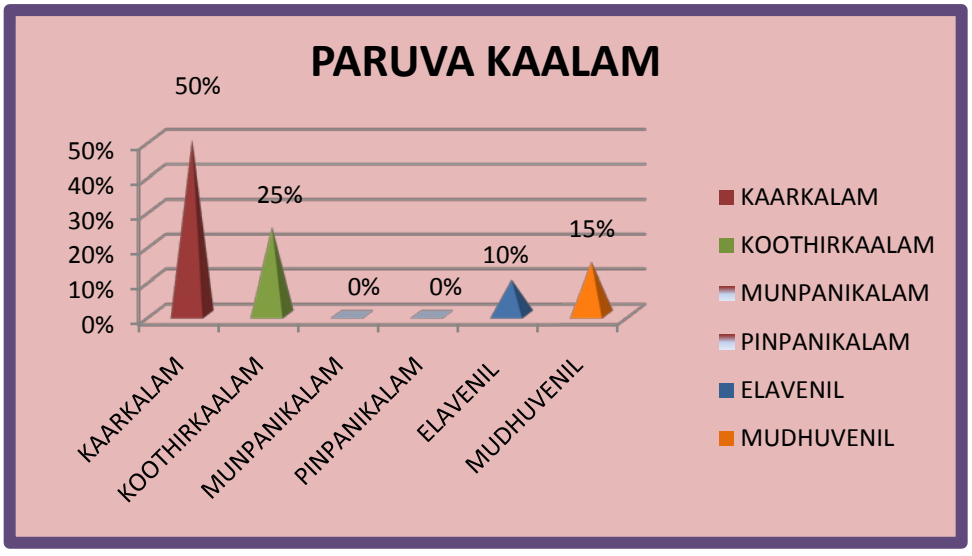



**Inference:**

**From the above data 70% of patient from neithal, 30% of cases from marutham**

**Paruva kaalam :**

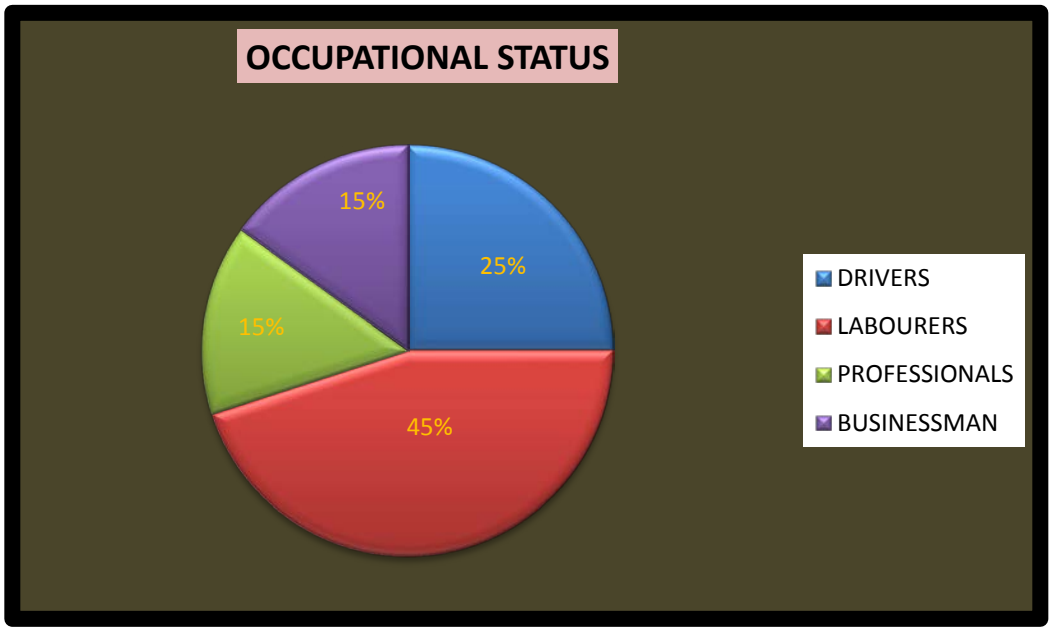
| Sl.No | Paruva Kaalam | Months | No.of patients/20 | Percentage |
|---|---|---|---|---|
| 1 | **Kaar kalam** | Avani, Puratasi, Mid Aug-Mid Oct | **10** | **50%** |
| 2 | **Koothir kalam** | Iyppasi, Kaarthigai Mid Oct-Mid Dec | **5** | **25%** |
| 3 | **Munpani kalam** | Margazhi, Thai Mid Dec-Mid Feb | **0** | **0%** |
| 4 | **Pinpani kalam** | Maasi, Panguni Mid Feb-Mid April | **0** | **0%** |
| 5 | **Elavenil kalam** | Chithirai, vaigasi Mid April- Mid June | **2** | **10%** |
| 6 | **Mudhuvenilkaalam** | Aani, Aadi Mid June-Mid Aug | **3** | **15%** |




**Inference : 50% of cases came in kaar kalam and 15% of cases in muthuvenil kalam and 25% of cases in koothir kalam.**

**Occupational Status:**

| Sl.No | Occupational status | No.of patients/20 | Percentage |
|---|---|---|---|
| ` 1 | Drivers | 5 | 25% |
| 2 | Labourers | 9 | 45% |
| 3 | Professionals | 3 | 15% |
| 4 | Businessman | 3 | 15% |




**Inference**

**25% of cases were drivers.**

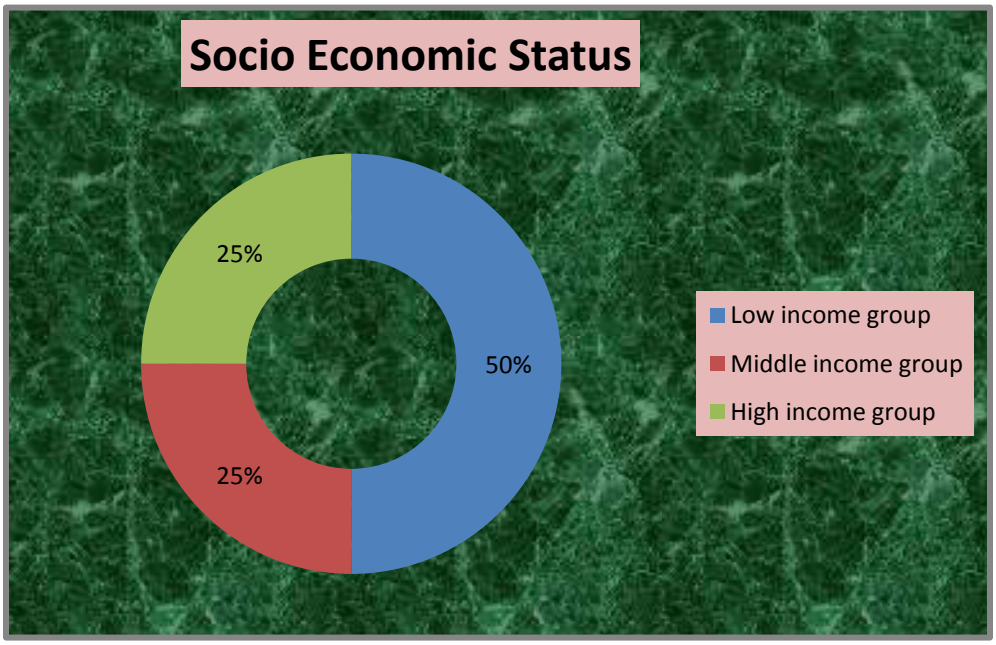
**45% of cases were labourers.**

**15% of cases were Business Man.**

**15% of cases were professionals.**

**Socio Economic Status:**

| Sl.No | Socio Economic Status | No.of patients/20 | Percentage |
|---|---|---|---|
| 1 | Low income group (below 10000/month) | 10 | 50% |
| 2 | Middle income group (below 15000/month) | 5 | 25% |
| 3 | High income group (below 20000/month) | 5 | 25% |

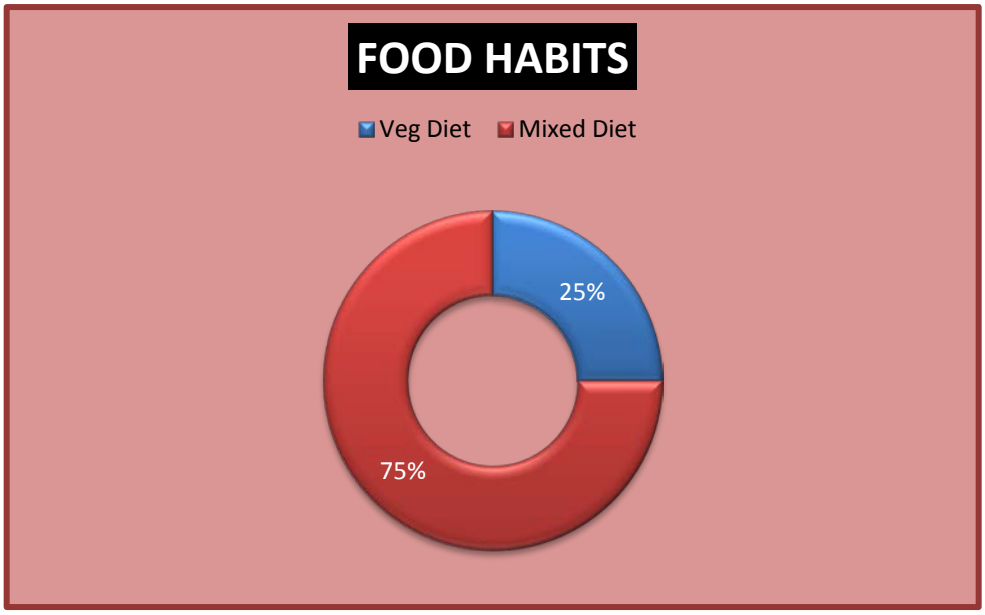



**Inference**

**50% of cases belong to Low income group and 25% of patients belong to lower income group. 25% of cases belong to high income group.**

**Food Habits:**

| Sl.No | Food Habit | No.of patients/20 | Percentage |
|---|---|---|---|
| 1. | Vegetarian Diet | 5 | 25% |
| 2. | Mixed Diet (incuding non-veg) | 15 | 75% |



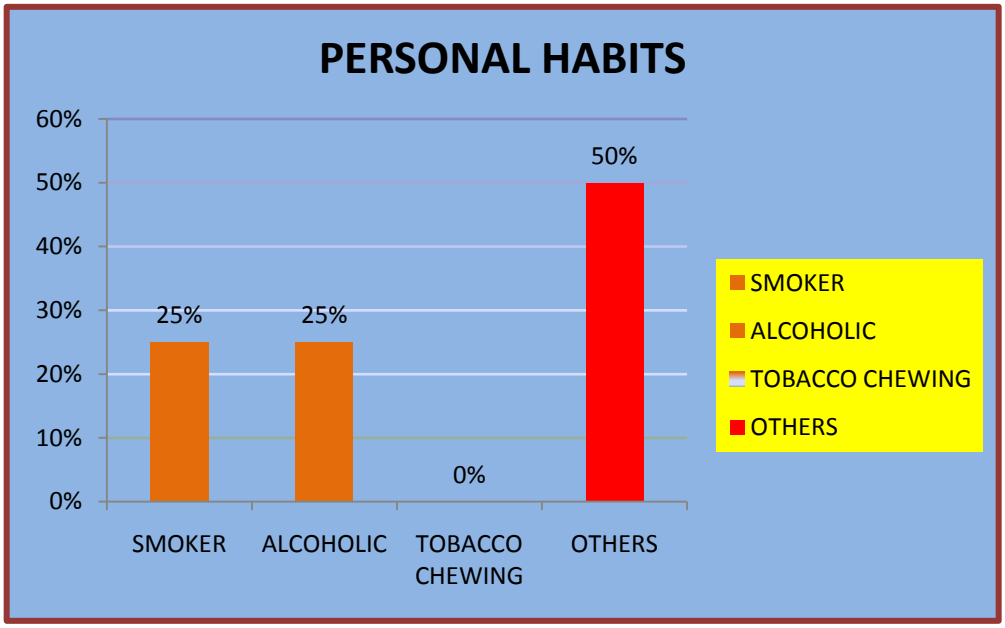

**Inference**

**75% of cases were mixed diet (incuding non-vegetarian).**

**25% of cases were vegetarian .**

**Personal Habits:**

| Sl.No | Personal Habits | No.of patients/20 | Percentage |
|---|---|---|---|
| 1 | Smoker | 5 | 25% |
| 2 | Alcoholic | 5 | 25% |
| 3 | Tobacco chewing | 0 | 0% |
| 4 | Others | 10 | 50% |

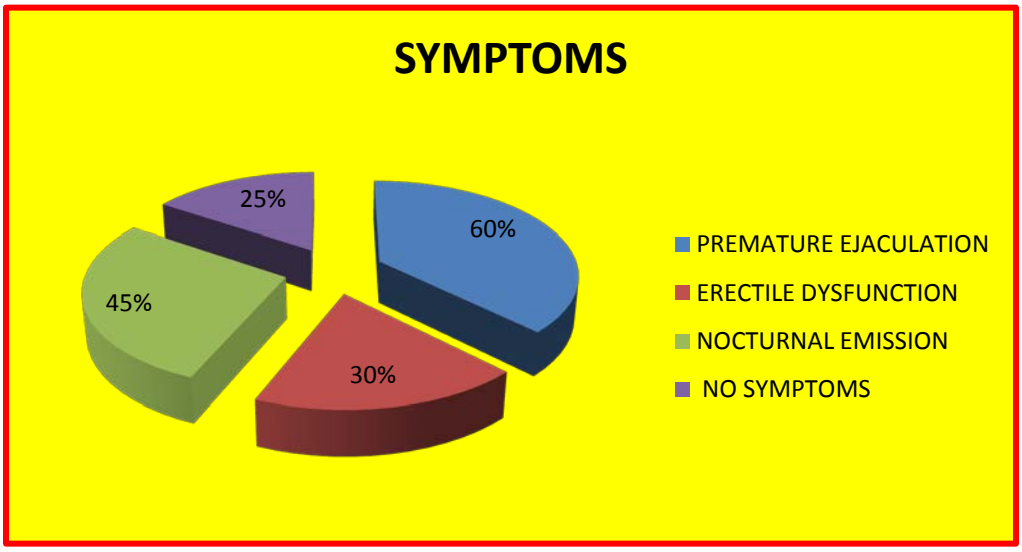



**Inference**

**25% of cases were smokers , 25% of cases were alcoholic & 50% were having other habits.**

**Symptoms:**

| Sl.No | Symptoms | No.of patients/20 | Percentage |
|---|---|---|---|
| 1 | Premature ejaculation | 12 | 60% |
| 2 | Erectile Dysfunction | 6 | 30% |
| 3 | Nocturnal Emission | 9 | 45% |
| 4 | No symptoms | 5 | 25% |

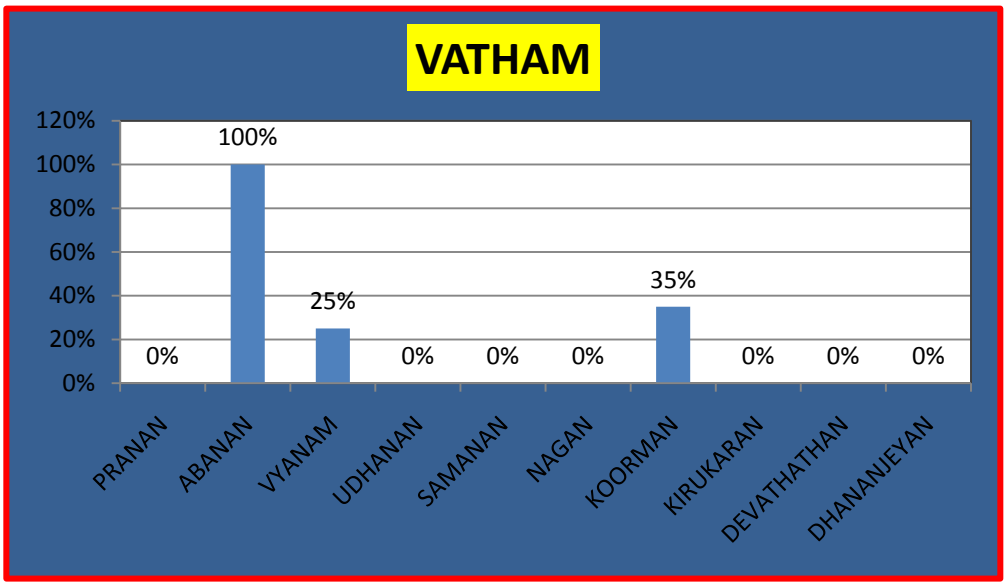



**Inference**

**60% of cases came with complaints of premature ejaculation and 30% of cases with erectile dysfunction, 45% cases with nocturnal emission and 25% of cases had no symptoms.**

**Vatham:**

| Sl.No | Vatham | No.of patients/20 | Percentage |
|---|---|---|---|
| 1 | Pranan | 0 | 0% |
| 2 | Abanan | 20 | 100% |
| 3 | Vyanan | 5 | 25% |
| 4 | Udhanan | 0 | 0% |
| 5 | Samanan | 0 | 0% |
| 6 | Nagan | 0 | 0% |
| 7 | Koorman | 7 | 35% |
| 8 | Kirukaran | 0 | 0% |
| 9 | Devathathan | 0 | 0% |
| 10 | Dhananjeyan | 0 | 0% |

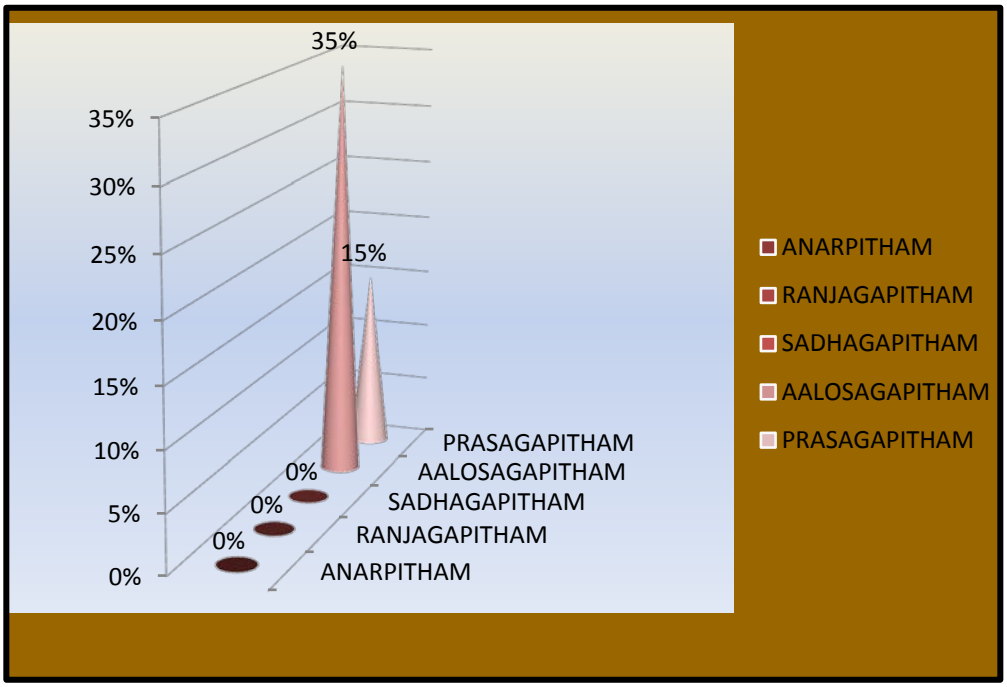



**Inference**

**Abaanan was affected in 100% of patients,Koorman was affected in 35% of patients and Vyanan was affected in 25% of patients.**

**Pitham:**

| Sl.No | Pitham | No.of patients/20 | Percentage |
|---|---|---|---|
| 1 | Anar Pitham | 0 | 0% |
| 2 | Ranjaga Pitham | 0 | 0% |
| 3 | Sadhaga Pitham | 0 | 0% |
| 4 | Aalosaga Pitham | 7 | 35% |
| 5 | Prasaga Pitham | 3 | 15% |

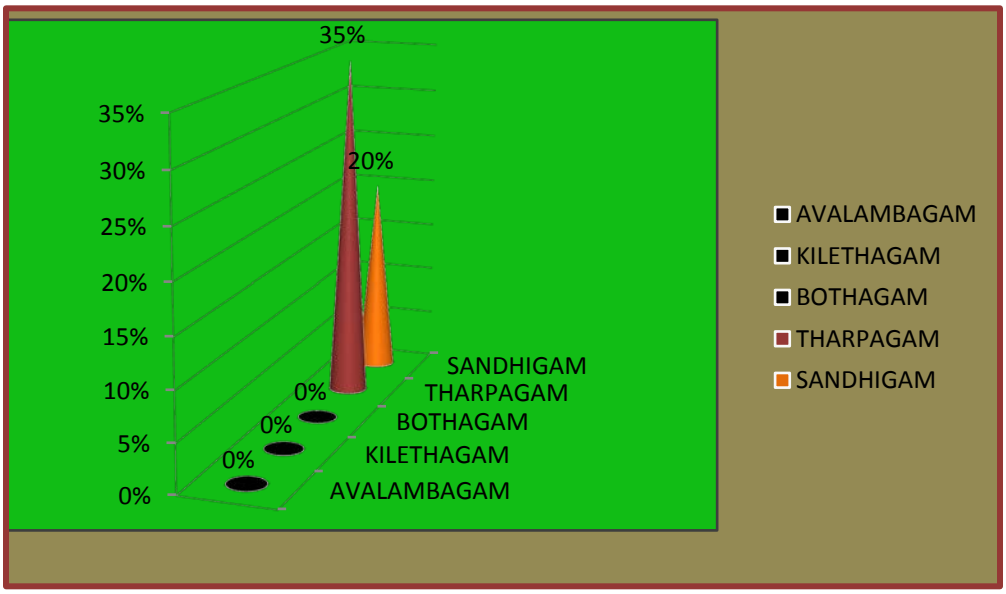



**Inference**

**Saathagam was affected in 35% of patients. Prasaga pitham was affected in 15% of patients**

**IYYAM:**

| Sl.No | Iyyam | No.of patients/20 | Percentage |
|---|---|---|---|
| 1 | Avalambagam | 0 | 0% |
| 2 | Kilethagam | 0 | 0% |
| 3 | Bothagam | 0 | 0% |
| 4 | Tharpagam | 7 | 35% |
| 5 | Sandhigam | 4 | 20% |

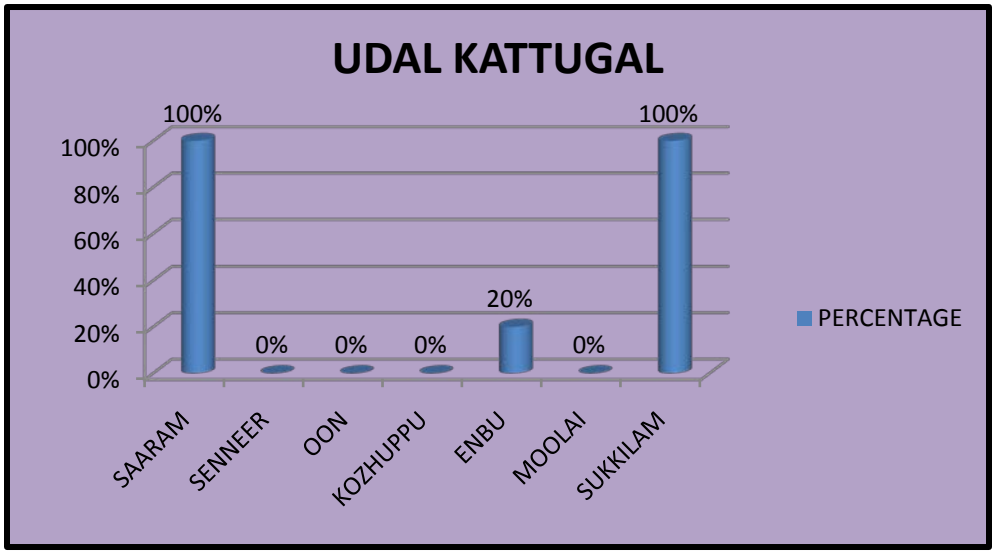



**Inference**

**Tharpagam was affected in 35% of patients and Santhigam in 20% of patients.**

**Udal Kattugal:**

| Sl.No | Udal Kattugal | No.of patients/20 | Percentage |
|---|---|---|---|
| 1 | Saaram | 20 | 100% |
| 2 | Senner | 0 | 0% |
| 3 | Oon | 0 | 0% |
| 4 | Kozhuppu | 0 | 0% |
| 5 | Enbu | 4 | 20% |
| 6 | Moolai | 0 | 0% |
| 7 | Sukkilam | 20 | 100% |

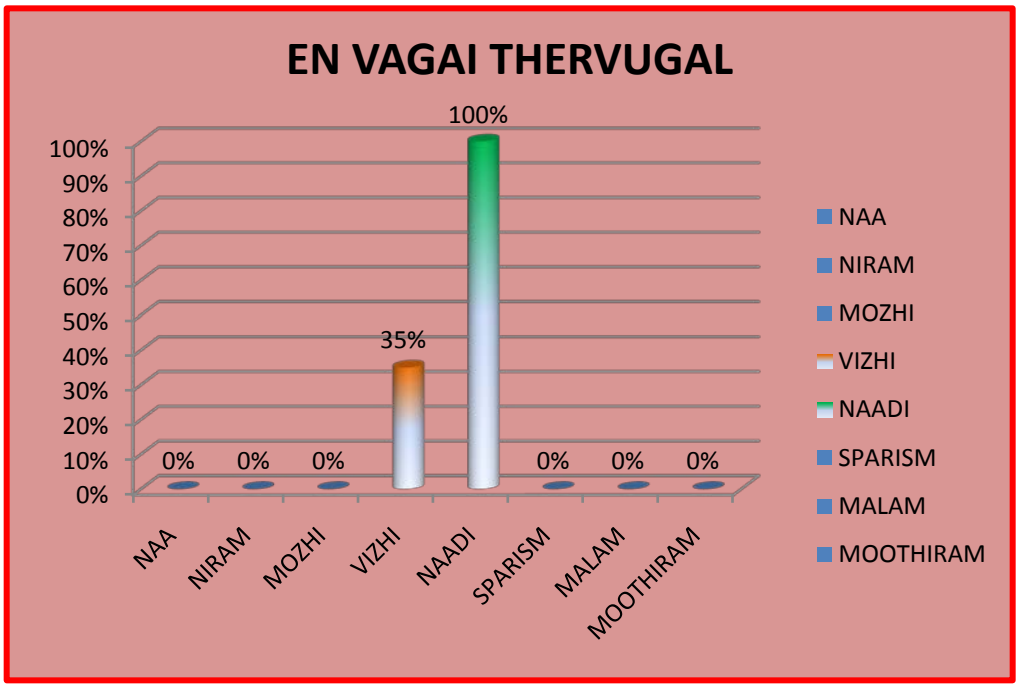



**Inference :**

**Both Saaram and Sukkilam were affected in 100% of patients and Enbu was affected in 20% of patients.**

**Enn Vagai Thervu:**

| Sl.No | Enn Vagai Thervu | No.of patients/20 | Percentage |
|---|---|---|---|
| 1 | Naa | 0 | 0% |
| 2 | Niram | 0 | 0% |
| 3 | Mozhi | 0 | 0% |
| 4 | Vizhi | 7 | 35% |
| 5 | Naadi | 20 | 100% |
| 6 | Sparism | 0 | 0% |
| 7 | Malam | 0 | 0% |
| 8 | Moothiram | 0 | 0% |

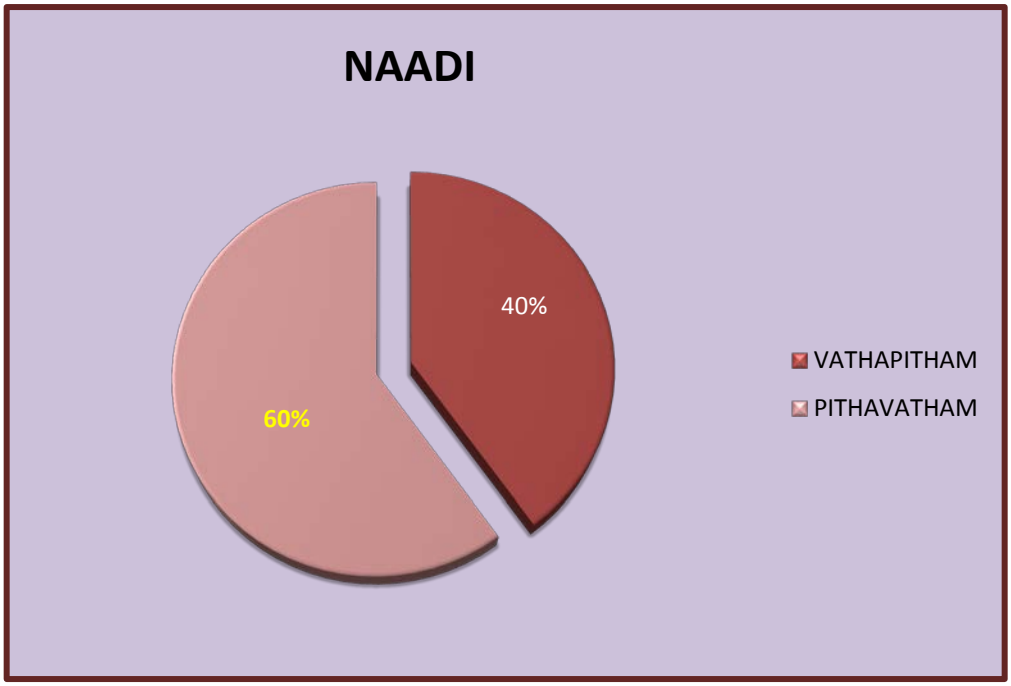



**Inference**

**Naadi was affected in 100% of patients and 35% of patients vizhi was affected.**

**Naadi:**

| Sl.No | Naadi | No.of patients/20 | Percentage |
|---|---|---|---|
| 1 | Vathapitham | 8 | 40% |
| 2 | Pithavatham | 12 | 60% |

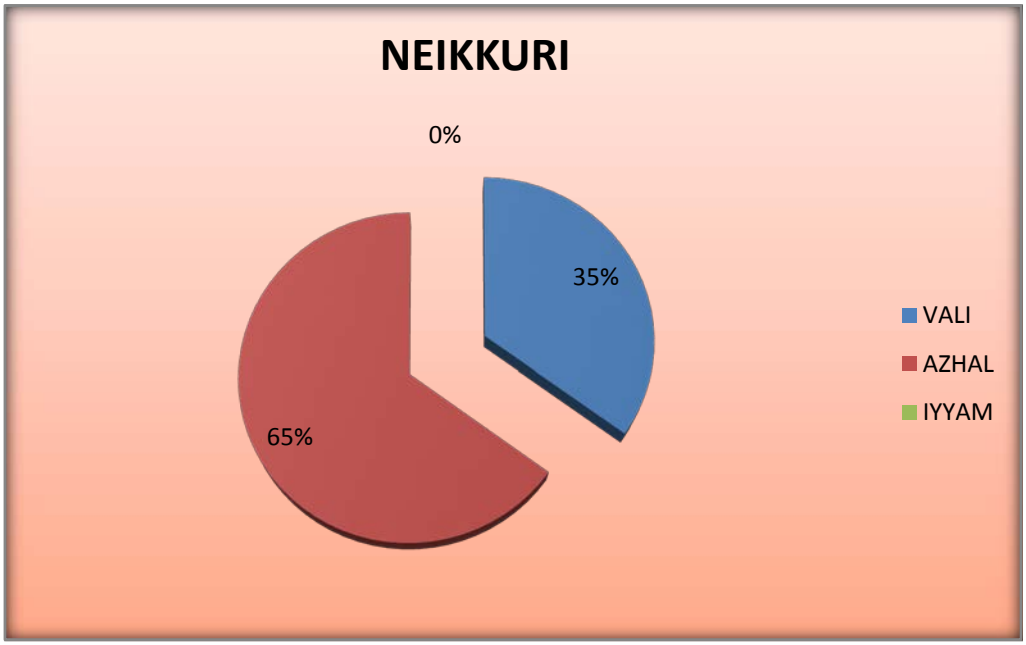



**Inference**

**40% of patient's vatha pitham naadi was felt and 60% of cases Pitha vatha naadi was felt.**

**Neikkuri:**

| Sl.No | Neikkuri | No.of patients/20 | Percentage |
|---|---|---|---|
| 1 | Vali (spreads like snake) | 7 | 35% |
| 2 | Azhal (spreads like ring) | 13 | 65% |
| 3 | Iyyam (stands like pearl) | 0 | 0% |

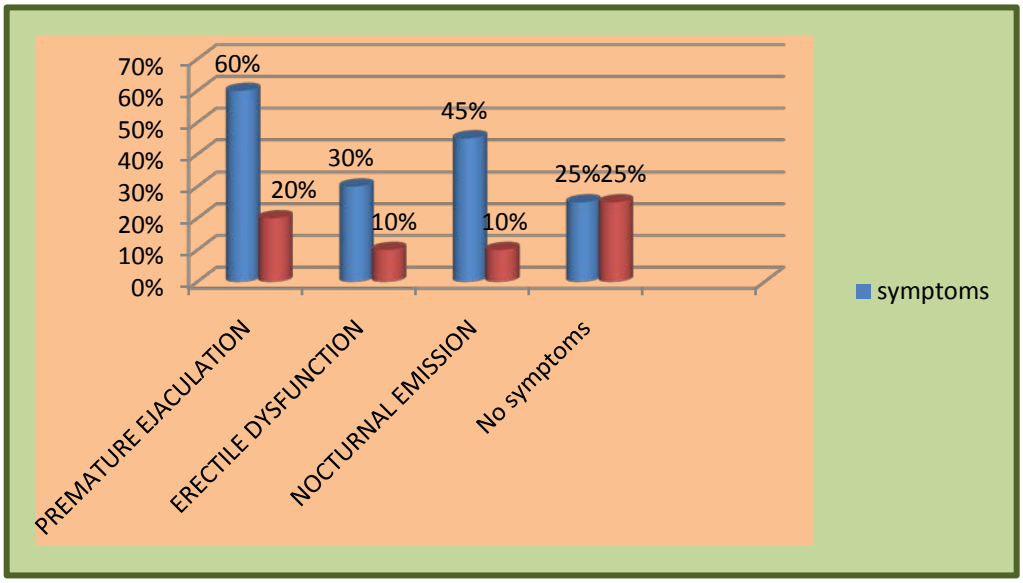



**Inference:**

**65% of cases show azhal neikuri and 35% shows vali neikkuri.**

**Clinical Progress:**

| Sl.No | Symptoms | No.of patients/20 | | Percentage | |
|---|---|---|---|---|---|
| | | BT | AT | BT | AT |
| 1 | Premature ejaculation | 12 | 4 | 60% | 20% |
| 2 | Erectile Dysfunction | 6 | 2 | 30% | 10% |
| 3 | Nocturnal Emission | 9 | 2 | 45% | 10% |
| 4 | No symptoms | 5 | 5 | 25% | 25% |



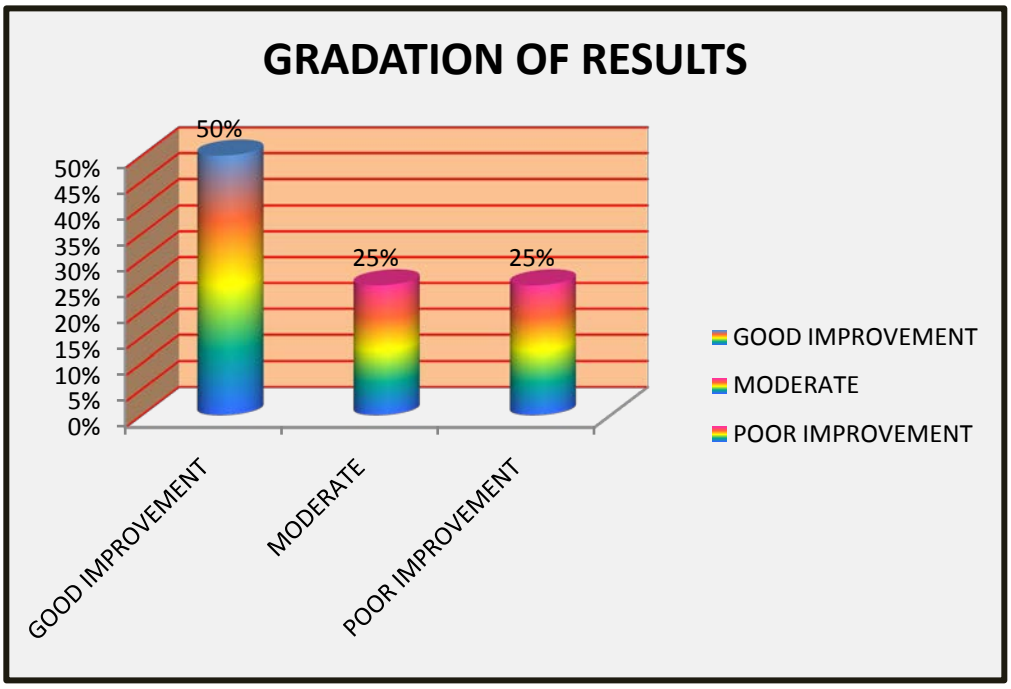

**Inference**

**Before treatment 60% of cases had premature ejaculation, 45% of cases had nocturnal emission & 30% having erectile dysfunction.**

**After treatment premature ejaculation ,nocturnal emission were 20% and 10% of cases respectively & 10% having erectile dysfunction.**

**Gradation of results*:***

| Sl.No | Gradation of results | No.of patients/20 | Percentage |
|---|---|---|---|
| 1 | Good Improvement | 10 | 50% |
| 2 | Moderate Improvement | 5 | 25% |
| 3 | Poor Improvement | 5 | 25% |




**Inference**

**50% of Patients show good improvement, 25% of shows moderate improvement and 25% of cases shows poor improvement.**

# LABORATORY INVESTIGATION REPORT (OP)

| SL. NO. | OP. NO. | NAME | AGE | HEAMOTOLOGICAL REPORT | | | | | | | | | | | | | | URINE ANALYSIS | | | | | | STOOL EXAMINATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | BEFORE TREATMENT | | | | AFTER TREATMENT | | | | ESR(mm) | | | | HB(Gm) | | BT | | | AT | | | BT | | AT | |
| | | | | TC (Cu/mm) | DC | | | TC (Cu/mm) | DC | | | BT | | AT | | BT | AT | | | | | | | | | | |
| | | | | | P | L | E | | P | L | E | ½ Hr | 1 Hr | ½ Hr | 1 Hr | | | Alb | Sug | Dep | Alb | Sug | Dep | Ova | Cyst | Ova | Cyst |
| 1 | 626 | Iyyanar | 32 | 9600 | 45 | 32 | 3 | 9700 | 55 | 36 | 3 | 2 | 5 | 3 | 6 | 14 | 14.2 | Nil | Nil | OPC | Nil | Nil | Nil | Nil | Nil | Nil | Nil |
| 2 | 204 | Dillibabu | 26 | 9400 | 57 | 38 | 5 | 9600 | 60 | 37 | 4 | 3 | 5 | 3 | 8 | 12.8 | 13 | Nil | Nil | OPC | Nil | Nil | OPC | Nil | Nil | Nil | Nil |
| 3 | 6178 | Thamaodharan | 22 | 9400 | 58 | 34 | 6 | 9200 | 55 | 32 | 5 | 2 | 5 | 4 | 10 | 13 | 12.8 | Nil | Nil | OPC | Nil | Nil | OPC | Nil | Nil | Nil | Nil |
| 4 | 1117 | Venkatesan | 30 | 9400 | 58 | 39 | 3 | 9000 | 60 | 38 | 2 | 10 | 22 | 9 | 18 | 12.4 | 12.5 | Nil | Nil | OPC | Nil | Nil | Nil | Nil | Nil | Nil | Nil |
| 5 | 7356 | Sudhagar | 40 | 10600 | 62 | 34 | 4 | 10450 | 55 | 30 | 4 | 7 | 17 | 8 | 18 | 14 | 14.1 | Nil | Nil | OPC | Nil | Nil | Nil | Nil | Nil | Nil | Nil |
| 6 | 7507 | Vijay | 28 | 9400 | 56 | 39 | 5 | 9600 | 60 | 35 | 6 | 12 | 24 | 10 | 15 | 13 | 13 | Nil | Nil | OPC | Nil | Nil | Nil | Nil | Nil | Nil | Nil |
| 7 | 5744 | Raj | 39 | 9700 | 58 | 37 | 2 | 9700 | 55 | 35 | 3 | 10 | 18 | 15 | 20 | 12.5 | 12.1 | Nil | Nil | FPC | Nil | Nil | Nil | Nil | Nil | Nil | Nil |
| 8 | 1102 | Mohan | 34 | 10700 | 66 | 30 | 4 | 10800 | 65 | 30 | 5 | 2 | 3 | 4 | 6 | 14 | 14 | Nil | Nil | OPC | Nil | Nil | OPC | Nil | Nil | Nil | Nil |
| 9 | 6292 | Saravanan | 31 | 9300 | 57 | 38 | 5 | 9400 | 55 | 35 | 6 | 10 | 20 | 9 | 18 | 13.8 | 13.7 | Nil | Nil | OPC | Nil | Nil | OPC | Nil | Nil | Nil | Nil |
| 10 | 201 | Azhagiri | 36 | 9000 | 58 | 38 | 4 | 9200 | 56 | 35 | 4 | 2 | 4 | 3 | 6 | 14.8 | 15 | Nil | Nil | OPC | Nil | Nil | OPC | Nil | Nil | Nil | Nil |
| 11 | 4027 | Shanmugavel | 28 | 9000 | 60 | 32 | 8 | 8800 | 62 | 30 | 6 | 6 | 12 | 5 | 10 | 12.6 | 12.5 | Nil | Nil | FPC | Nil | Nil | FPC | Nil | Nil | Nil | Nil |
| 12 | 195 | Aanandhan | 24 | 9700 | 54 | 42 | 4 | 9600 | 58 | 40 | 5 | 10 | 22 | 8 | 18 | 14 | 13.5 | Nil | Nil | FPC | Nil | Nil | OPC | Nil | Nil | Nil | Nil |
| 13 | 1063 | Dhilipkumar | 25 | 10100 | 59 | 37 | 4 | 10300 | 60 | 36 | 3 | 15 | 25 | 10 | 13 | 13.2 | 13 | Nil | Nil | OPC | Nil | Nil | Nil | Nil | Nil | Nil | Nil |
| 14 | 5685 | Dilli | 40 | 10700 | 62 | 31 | 7 | 10500 | 60 | 34 | 8 | 15 | 30 | 12 | 18 | 15 | 14.5 | Nil | Nil | OPC | Nil | Nil | Nil | Nil | Nil | Nil | Nil |
| 15 | 1924 | Sridhar | 26 | 9800 | 55 | 42 | 3 | 9750 | 58 | 40 | 4 | 5 | 22 | 4 | 10 | 12.2 | 12.5 | Nil | Nil | OPC | Nil | Nil | OPC | Nil | Nil | Nil | Nil |
| 16 | 4261 | Sundhar | 34 | 9200 | 56 | 38 | 6 | 9350 | 55 | 42 | 5 | 5 | 10 | 8 | 16 | 12.4 | 12.5 | Nil | Nil | OEC | Nil | Nil | Nil | Nil | Nil | Nil | Nil |
| 17 | 5023 | Babu | 28 | 9400 | 58 | 39 | 3 | 9450 | 56 | 40 | 2 | 3 | 5 | 4 | 8 | 12 | 12 | Nil | Nil | OEC | Nil | Nil | Nil | Nil | Nil | Nil | Nil |
| 18 | 518 | Subramani | 27 | 9600 | 59 | 37 | 4 | 9550 | 60 | 35 | 3 | 7 | 12 | 10 | 14 | 13 | 12.5 | Nil | Nil | OEC | Nil | Nil | Nil | Nil | Nil | Nil | Nil |
| 19 | 7130 | Vinayagamorthy | 33 | 9600 | 58 | 36 | 6 | 9600 | 60 | 35 | 3 | 7 | 13 | 6 | 14 | 12.4 | 13 | Nil | Nil | OPC | Nil | Nil | Nil | Nil | Nil | Nil | Nil |
| 20 | 2709 | Balamurgan | 23 | 9000 | 59 | 35 | 6 | 9100 | 58 | 34 | 5 | 6 | 10 | 5 | 12 | 14.6 | 14.6 | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil | Nil |

TC – Total Count
Dc – Differential Count
P – Polymorph
L – Lymphocyte
E – Eosinophil

Hb – Haemoglobin
ESR – Erythrocyte Sedimentation Rate
Alb – Albumin
Sug – Sugar
Dep – Deposits

OEC – Occasional Epithelial Cells
OPC – Occasional Pus Cells
FPC – Few Pus Cells
FEC – Few Epithelial Cells

# NO .OF OP PATIENTS-BEFORE TREATMENT AND AFTER TREATMENT

| S.No | O.P. NO. | NAME | AGE | SEMEN ANALYSIS BEFORE TREATMENT | SEMEN ANALYSIS AFTER TREATEMNT | TOTAL NO. OF DAYS | RESULT |
|---|---|---|---|---|---|---|---|
| 1. | 626 | Iyyanar | 32 | TSC – 20 million/cu. mm<br>SM -20 % | TSC – 70 million/cu. Mm<br>SM – 48% | 105 Days | Good Improvement |
| 2. | 204 | Dillibabu | 26 | TSC -25 million/cu. mm<br>SM - 55 % | TSC – 48 million/cu. Mm<br>SM - 58 % | 65 Days | Moderate Improvement |
| 3. | 6178 | Thamodharan | 22 | TSC –17 million/cu. mm<br>SM - 07 % | TSC – 25 million/cu. Mm<br>SM - 10 % | 78 Days | Poor Improvement |
| 4. | 1117 | Venkatesan | 30 | TSC – 19 million/cu. mm<br>SM - 24 % | TSC – 59 million/cu. Mm<br>SM - 50% | 115 Days | Good Improvement |
| 5. | 7356 | Sudhagar | 40 | TSC – 09 million/cu. mm<br>SM - 03 % | TSC –55 million/cu. Mm<br>SM - 35 % | 75 Days | Good Improvement |
| 6. | 7507 | Vijay | 28 | TSC – 67 million/cu. mm<br>SM - 15 % | TSC – 70 million/cu. Mm<br>SM - 30 % | 90 Days | Moderate Improvement |
| 7. | 5744 | Raj | 39 | TSC – 15 million/cu mm<br>SM - 04 % | TSC – 45 million/cu. Mm<br>SM - 28 % | 95 Days | Good Improvement |
| 8. | 1102 | Mohan | 34 | TSC – 35 million/cu. mm<br>SM - 30 % | TSC – 50 million/cu. Mm<br>SM - 55 % | 110 Days | Moderate Imporvement |
| 9. | 6292 | Saravanan | 31 | TSC – 60 million/cu. mm<br>SM - 20 % | TSC – 85 million/cu. Mm<br>SM - 45 % | 85 Days | Good Improvement |
| 10. | 201 | Azhagiri | 36 | TSC – 12 million/cu. mm<br>SM - 03 % | TSC – 16 million/cu. Mm<br>SM - 04 % | 65 Days | Poor Improvement |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 11. | 4027 | Shanmugavel | 28 | TSC – 02 million/cu. mm<br>SM - 3 % | TSC –45 million/cu. mm<br>SM - 45 % | 62 Days | Good Improvement |
| 12. | 195 | Aanandhan | 24 | TSC – 50 million/cu. mm<br>SM - 20 % | TSC –68 million/cu. mm<br>SM - 30 % | 87 Days | Moderate Improvement |
| 13. | 1063 | Dhilipkumar | 25 | TSC –45 million/cu. mm<br>SM - 30 % | TSC – 70 million/cu. mm<br>SM - 53 % | 76 Days | Good Improvement |
| 14. | 5685 | Dilli | 40 | TSC – 15 million/cu. mm<br>SM – only few seen | TSC – 45 million/cu. mm<br>SM – only few seen | 92 Days | Moderate Improvement |
| 15. | 1924 | Sridhar | 26 | TSC –59 million/cu. mm<br>SM - 12 % | TSC –75 million/cu. mm<br>SM - 40 % | 75 Days | Good Improvement |
| 16. | 4261 | Sundar | 34 | TSC – 25 million/cu. mm<br>SM - 10 % | TSC – 50 million/cu. mm<br>SM - 50 % | 58 Days | Good Improvement |
| 17. | 5023 | Babu | 28 | TSC – 09 million/cu. mm<br>SM - 2 % | TSC – 56 million/cu. mm<br>SM - 55 % | 95 Days | Good Improvement |
| 18. | 518 | Subramani | 27 | TSC – 20 million/cu. mm<br>SM - 28 % | TSC – 30 million/cu. mm<br>SM - 25 % | 49 Days | Poor Improvement |
| 19. | 7130 | Vinayaga moorthy | 33 | TSC – 18 million/cu. mm<br>SM - 20 % | TSC – 20 million/cu. mm<br>SM - 15 % | 56 Days | Poor Improvement |
| 20. | 2709 | Balamurugan | 23 | TSC – 70 million/cu. mm<br>SM - 13 % | TSC – 75 million/cu. mm<br>SM - 35 % | 45 Days | Moderate Improvement |

**BEFORE TREATMENT** **Mr.Sudhakar 40/M**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822, Chennai Tiruvallur High Road
Ambattur, Chennai - 600 052
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Mobile : 98841 94436


*Quality You Can Depend On* ****

| | | | |
|---|---|---|---|
| Patient ID | : AK/12/1982 | Coll.Dt & Time | : 20.07.2012 |
| Patient Name | : Mr.SUDHAGAR | Rep.Dt & Time | : 20.07.2012 |
| Ref by | : Dr.S.THILLAIVANAN., | Age / Sex | : 40 Yrs / M |

## LABORATORY REPORT

| INVESTIGATIONS | FINDINGS | REFERENCE RANGE |
|---|---|---|

## CLINICAL PATHOLOGY

### SEMINAL ANALYSIS

**Macro Examination**

Colour – Grey White
Consistency – Liquid
Reaction - Alkaline
Volume – 1.8 ml
Viscosity – Normal
Liquefaction – Within 45 minutes

**Micro Examination**

Sperm count - 09 million / cumm

Pus cells - 8 - 10 / HPF

Epithelial cells - 0 – 1 /HPF

RBCs - 1 - 3 /HPF

| ACTIVE | MOTILITY | SLUGGISH | NONMOTILE |
|---|---|---|---|
| ½ hr | 03 % | 01% | 96 % |

Lab Incharge 20/7/12

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Phone : 044-2658 4417, 2658 4418
Mobile : 98841 94436

*Quality You Can Depend On* ****

| | | | |
|---|---|---|---|
| Patient ID | : AK/12/1982 | Coll.Dt & Time | : 15.10.2012 |
| Patient Name | : Mr.SUDHAGAR | Rep.Dt & Time | : 15.10.2012 |
| Ref by | : Dr.S.THILLAIVANAN., | Age / Sex | : 40 Yrs / M |

## LABORATORY REPORT

| INVESTIGATIONS | FINDINGS | REFERENCE RANGE |
|---|---|---|

## CLINICAL PATHOLOGY

### SEMINAL ANALYSIS

**Macro Examination**

Colour – Grey White
Consistency – Liquid
Reaction - Alkaline
Volume – 1.8 ml
Viscosity – Normal
Liquefaction – Within 45 minutes

**Micro Examination**

Sperm count - 55 million / cumm

Pus cells - 8 - 10 / HPF

Epithelial cells - 0 – 1 /HPF

RBCs - 1 - 3 /HPF

| ACTIVE | MOTILITY | SLUGGISH | NONMOTILE |
|---|---|---|---|
| ½ hr | 35 % | 10 % | 55 % |

Lab Incharge 15/7/12

**BEFORE TREATMENT** **Mr. Ayyanar 33/M**


# HITECH DIAGNOSTIC CENTRE

Multi Speciality Reference Laboratory

**Central Lab**
1, Millers Road, Kilpauk, Chennai-10.
Tel : 4291 9999

**CT Scan, Lab & Corporate Health Centre**
13, Dr. Nair Road, T.Nagar, Chennai-17
Tel : 4293 8200

Web : www.hitechlabsindia.com

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MYLAPORE 4207 4934 | SALIGRAMAM 4554 2183 | ANNA NAGAR 4261 2741 | TAMBARAM 4315 9190 | WASHERMENPET 4204 9452 | AMBATTUR 4208 6905 | PERAVALLUR 4278 9603 | VILLIVAKKAM 4355 4801 | TRIPLICANE 4351 8505 | ADYAR 4558 7973 | MADIPAKKAM 2247 5071


Patient : P0352746 **Mr. AYYANAR. (33/M)**
SID.No. : **029739**
Branch : **SALIGRAMAM**
Address :

Ph :9884603993

SID Date :16/05/2012
Reg Time :09:32:40

Rpt Date :16/05/2012
Rpt Time :16:04:21
Page # :1
**Final Report**

Referrer : **Dr.THILLAIVANAN.S. BSMS.,MD.,**

## TEST REPORT

| Test | Result | | Reference Value |
|---|---|---|---|
| **CLINICAL PATHOLOGY** | | | |
| **SEMEN ANALYSIS** | | | |
| Method : MACROSCOPY & MICROSCOPY | | | |
| Time Of Collection | : 09:30 | AM | |
| Period of sexual abstinen | : 4 | Days | |
| Liquefaction Time | : 20 | Minutes | |
| Colour | : White | | |
| Volume | : 2.5 | ml | 2 - 5 ml |
| Viscosity | : Normal | | |
| Reaction pH | : 8.0 | | 7.5 - 8.5 |
| MICROSCOPIC CHARACTERISTICS | | | |
| Sperm concentration | : 20.0 | Millions/ml | 40 - 140 Millions/ml |
| MOTILITY | | AFTER 4 HRS | |
| Rapid Progressive | : 20 % | 10 % | |
| Moderately progressive | : 10 % | 5 % | |
| Sluggishly progressive | : 10 % | 5 % | |
| Non Motile | : 60 % | 80 % | |
| Agglutination | : Nil | | |
| MORPHOLOGY | : Normal | | |
| Microscopy | : Plenty Of Pus Cells Seen | | |
| Fructose (Qualitative) | : Present | | |
| Remarks | : The count may be inaccurate due to plenty of pus cells seen.Please repeat test after the treatment of 4 weeks. | | |

Mrs. Malini Parsuraman M.Sc., Chief Biochemist | Dr. Radhi Lawrence AB (Path) Chief Pathologist | Dr. R. Rani MBBS, DCP, DNB Hemato Pathologist | Dr. Sp. Ganesan MBBS, DCP Medical Director

PLEASE SEE REVERSE FOR MORE INFORMATION

**AFTER TREATMENT** **Mr. Ayyanar 33/M**

08

# HITECH DIAGNOSTIC CENTRE

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Patient : P0352746 **Mr. AYYANAR. (33/M)**
SID.No. : **029739**
Branch : **SALIGRAMAM**
Address :

Ph :9884603993

SID Date :16/08/2012
Reg Time :09:32:40

Rpt Date :16/08/2012
Rpt Time :16:04:21
Page # :1
**Final Report**

Referrer : **Dr.THILLAIVANAN.S. BSMS.,MD.,**

## TEST REPORT

| Test | Result | | Reference Value |
|---|---|---|---|
| **CLINICAL PATHOLOGY** | | | |
| **SEMEN ANALYSIS** | | | |
| Method : MACROSCOPY & MICROSCOPY | | | |
| Time Of Collection | : 09:30 | AM | |
| Period of sexual abstinen | : 4 | Days | |
| Liquefaction Time | : 20 | Minutes | |
| Colour | : White | | |
| Volume | : 2.5 | ml | 2 - 5 ml |
| Viscosity | : Normal | | |
| Reaction pH | : 8.0 | | 7.5 - 8.5 |
| MICROSCOPIC CHARACTERISTICS | | | |
| Sperm concentration | : 70 | Millions/ml | 40 - 140 Millions/ml |
| MOTILITY | | AFTER 4 HRS | |
| Rapid Progressive | : 48 % | 10 % | |
| Moderately progressive | : 10 % | 5 % | |
| Sluggishly progressive | : 10 % | 5 % | |
| Non Motile | : 60 % | 80 % | |
| Agglutination | : Nil | | |
| MORPHOLOGY | : Normal | | |
| Microscopy | : Plenty Of Pus Cells Seen | | |
| Fructose (Qualitative) | : Present | | |
| Remarks | : The count may be inaccurate due to plenty of pus cells seen.Please repeat test after the treatment of 4 weeks. | | |

Mrs. Malini Parsuraman M.Sc., Chief Biochemist | Dr. Radhi Lawrence AB (Path) Chief Pathologist | Dr. R. Rani MBBS, DCP, DNB Hemato Pathologist | Dr. Sp. Ganesan MBBS, DCP Medical Director

PLEASE SEE REVERSE FOR MORE INFORMATION

# Discussion

## DISCUSSION :

One of the Predominant disorders that endanger human species is **INFERTILITY** in Both men and women. The incidence of infertility is comparatively higher in males became of the drastic changes in human life style – irregular food habits, high calorie food items, fast food behavioral changes. Environmental toxins and changed compounds used for dispensing various ailments.

It has been suggested that the average sperm count has been decreasing over the past 50 years.

Aan maladu as stated in yugi vaidya chindhamani has close resemblance with male infertility in Allopathic Medicine.

In my study 20 patients were treated in outpatient department of Post graduate pothumaruthuvam department, Govt Siddha Medical College Hospital, Chennai – 106.

All patients were subjected to preliminary investigations which include haematological, urine examination, Semen Analysis before and after Treatment.

Before Treatment purgative was given to all patients to balance the altered three dhosas (vatha,pitha,kapha).

The Trial Medicine Isabgol chooranam was administered from the next day onwards, course of the Treatment is 90 days.

**Age Distribution:**

According to this study age distribution was 55% of patients were in 21-30years. 45% years patients were in 31-40 years.

**Distribution of Thinai:**

According to this study 70% of the Patients came from Neithal because Chennai and surrounding areas come under Neithal thinai.

**Paruvakalam:**

According to this study 50% were in Kaar kaalam, 25% were in Koothir kaalam, 10% were in Elavenil kaalam, 15% in Muthuvenil kaalam. Seasonal incidence is not affected their disease, male infertility.

**Occupational Status:**

25% of the patients were Drivers, 45% of patients were working as a labourers, 15% of patients are Businessman, 15% of patients are Professionals.

**Socio Economic Status:**

The majority of the Patients affected are from poor socio economic status. Poor hygienic conditions expose to polluted atmosphere and lower immune response made them prone to the disease.

**Food Habits:**

25% Patients were pure vegetarian, 75% were Mixed Diet (incuding non-vegetarian). Though a non-vegetarian diet account is not a reason for the occurrence of male infertility.

**Personal Habits:**

In my study 25% of the Patients were using alcohol, 25% were smoker, 50% were having others.

The observation coincide with the conception that male infertility the disease may be due to smoking, Alcohol consumption.

**Symptoms:**

According to this study 60% of the patients have premature ejaculation and 30% of the patients had erectile dysfunction,45% patients have nocturnal emission and 25% have no symptoms.

**Classification of Results According To Vali, Azhal, Iyyam :-**

**Vali :**

a. Spermatogenesis, Premature Ejaculation, Nocturnal Emission are due to deranged Abana Vayu.

b. Erectile dysfunction is due to deranged viyanan.

c. In 100% patients abanan was affected, viyanan was affected 25% of patients. And koorman affected in 35% of cases.

**Azhal:**

Aalosaga Pitham was affected in 75% of Patients.

**Iyyam:**

Tharpagam may be affected in Patients hot atmosphere. 35% of patients Tharpagam were affected. 20 % of Patients santhigam was affected & produce Joint Pain.

**Udhal Kattugal:**

Both bodily and mental weakness arises when saaram was affected. In 100% of patients both the saaram and sukkilam were affected.In 20% of cases enbu was affected

**Envagai Thervu**

Naadi was affected in 100% of patients and 35% of patients vizhi was affected.

**Naadi**

In 40% of patients Vatha Pitha Naadi was felt and 60% of patients Pitha Vadha Naadi was felt.

**Neikuri**

65% of cases show azhal neikuri (spreads like ring) and 35% of cases show vali neikuri (spreads like snake).

**Clinical Progress:**

Before treatment 60% of cases had premature ejaculation, 30% of cases had erectile dysfunction and 45% of cases had nocturnal emission. After treatment premature ejaculation, erectile dysfunction and nocturnal emission was relieved in 40% ,20% and 35% of cases respectively.

**Trial Medicine:**

All the 20 patients treated with the Trial Medicine ISABGOL CHOORANAM with milk,twice a day for 90 days. The disease and treatment are based primarily on the derangement of Mukkutram, which again is based on the Pancha bootham theory. Incidence of Aan maladu and treatment are also based on these primary principles of Siddha medicine.

The bootham raises azhal kuttram in the body and so as lead to general weakness and reduced sperm cell production. Increased azhal kuttram is brought to normal mainly by enippu suvai and thuvarpu suvai.

These sweet and astringent tastes have the cool potency by nature.

A. Earth + Water = Sweet

B. Earth + Air = Astringent. Thus they decrease the azhal kuttram. Sweet taste increases the spermatogenesis. So I conclude the trial drugs cures the Aan Maladu and it comes under the **Ethirurai Maruthuvam.**

**Pharmacological Report & Toxicological Evaluation:**

The drug also subjected to pharmacological and toxicological tests in rat models. The results revealed that the drug had very effective results. There were no signs of toxicity as could be judged by the absence of undesirable clinical manifestations.

**Bio Statistical study:**

The bio-statistical report of the clinical trial shows significant result.

# Summary

# SUMMARY

The aim of the study is to increase the sperm count and sperm motility in male infertility patient. The trial medicine Isabgol Chooranam was prepared as per literature. The duration of the trial period is 90 days. The trial dose is Isabgol Chooranam 1gm ,twice a day with cow's milk. I had selected 20 patients for the trial based on Inclusion and Exclusion criteria. Before treatment routine blood, urine and semen analysis taken in all 20 patients. Siddha methods like udal thathukkal, Envagai thervu, Neerkuri and Neikuri were noted in case sheet proforma. Patients were instructed to come for next review once in 7 days. 15 patients were come with clinical symptoms like premature ejaculation, erectile dysfunction, nocturnal emission . The entire details of the patients were noted in the case sheet proforma.

**Age :**

Most of the patients were in the age group between 21-30 years.

**Thinai :**

Most of the patients were from Neithal Thinai 70%.

**Kalam :**

Seasonal Variances do not have any impact for affecting the people.

**Occupation:**

The disease is more common in people working in hot atmosphere like Labourers.

**Diet & Personal habits:**

People with habit of taking Vegetarian and Mixed Diet, smoking, Alcoholic have more incidence of the disease.

**Mukkutrum:**

In Vali ,abaanan ,koorman and viyanan, in Azhal Aalosagam and in Iyyam tharpagam were affected in most of the cases.

**Udal Thathugal:**

Saaram and sukkilam were affected in all the patients.

**Naadi :**

Pitha vatha naadi was most common naadi felt.

**Results after treatment:**

50% of patients show good improvement, 25% of patients shows moderate improvement and in 25% of patients poor improvement was observed.

.

The pharmacological studies reveal that trial drugs had good spermatogenesis effect in rats. The toxicity study revealed that there were no signs of toxicity as could be judged by the absence of undesirable clinical manifestations and no alteration in bio chemical markers.

The bio-statistical report of the clinical trial shows significant result.

# Conclusion

# CONCLUSION :

- ✓ **AAN MALADU** (Male infertility) is primarly due to the derangement of pitham.
- ✓ The trial medicine Isabgol chooranam predominating with Inippu and Thuvarppu taste respectively neutralizes the pitham.
- ✓ From the pre clinical pharmacological studies it is evident that the medicine was significant Spermatogenesis activity.
- ✓ The Isabgol chooranam do not produce any toxicity in preclinical study. So it is non toxic and safe drug for Aan maladu.
- ✓ From the preclinical study Isabgol chooranam increase the Testosterone level.
- ✓ No contra indication was reported during the course of the treatment.
- ✓ The trial medicine gave maximam relief from the symptoms of Aan maladu.
- ✓ The prepration of trial medicine is so easy and economical.
- ✓ Therefore the author concluded that the trial medicine ISABGOL CHOORANAM should be a very positive remedy for Aan maladu ( Male Infertility).

# Annexures

# Certificates

# The Tamil Nadu Dr. M.G.R. Medical University

69, Anna Salai, Guindy, Chennai-600 032

*This Certificate is awarded to Dr* .....S.THILLAIVANAN.....

*for participating as a ~~Resource~~ ~~Person~~ / Delegate in the VI Workshop on*

**"Research Methodology & Biostatistics"**

*for AYUSH Post-Graduates & Researchers*

*organized by the Department of Siddha*

*The Tamil Nadu Dr. M.G.R. Medical University*

*from 12th September 2011 to 16th September 2011*

**Dr. MAYILVAHANAN NATARAJAN**
M.S.Orth. M.Ch.Orth. (L'pool) Ph.D. D.Sc. F.R.C.S. D.Sc. (Hon)$^3$
**VICE CHANCELLOR**

**Dr. SUDHA SESHAYYAN,** M.S.
REGISTRAR (FAC)

**Dr. N. KABILAN,** M.D. (Siddha)
READER, DEPT. OF SIDDHA

# VEL'S COLLEGE OF PHARMACY

Approved by the Government of Tamil Nadu
Affiliated to The Tamil Nadu Dr. MGR Medical University
Velan Nagar, P.V. Vaithiyalingam Road, Pallavaram, Chennai - 600 117
**Phone :** (91-44) 2266 2500 / 01 / 02 / 03 **Fax :** (91-44) 2266 2513
**E-mail :** velscollege@gmail.com **Web site :** www.velscollege.com




| S.No | Title of The Project | Name of The Investigator | Approval status/Remarks | Project Reference |
|---|---|---|---|---|
| 22. | Antineoplastic activity –In-vivo cytotoxic activity of Velvanga parpam against various prostatic cancer | Dr. K.Samraj | Total number of animals proposed was 48 mice and after having discussion it was decided to reduce 8 number of animals. | XIII/VELS/PCOL/ 22/2000/CPCSEA/I AEC/11.08.2012 |
| 23. | Beneficial effects of Galangin c ethanol- induced inflammation pancreas- A study in rat model. | Fathima Cynthia Antony | Total number of animals proposed was 42 rats. All the 42 rats were Sanctioned. | XIII/VELS/PCOL/ 23/2000/CPCSEA/I AEC/08.08.12 |
| 24. | Role of Inflammasomes in rats subjected to experimental pancreatitis – Influence of β – sitosterol | P. Monika | Total number of animals proposed was 42 rats. All the 42 rats were Sanctioned. | XIII/VELS/PCOL/ 24/2000/CPCSEA/I AEC/08.08.12 |
| 25. | A study on antiulcer and wound healing property of a traditiona herbal preparation in rats. | Dr. J. Anbu | According to the protocol 46 rats were proposed, but only 36 rats were sanctioned. | XIII/VELS/PCOL/ 25/2000/CPCSEA/I AEC/08.08.12 |
| 26. | Anticonvulsant activity of Madhana Biravam and Raja Rajeswara Kuligai In animal models | Dr. A. Kirubagaran | Total number of animals sanctioned was 42 mice. it was advised to share the control and standard group results. Since the similar pattern of the study has been planned in the same department. | XIII/VELS/PCOL/ 26/2000/CPCSEA/I AEC/11.08.2012 |
| 27. | Spermatogenic activity of Isabg Chooranam in rats | Dr. Thillai Vaanan | Total number of animals proposed was 42 rats. But only 35 animals were sanctioned because, it was advised to share the control and standard group results. | XIII/VELS/PCOL/ 27/2000/CPCSEA/I AEC/11.08.2012 |


**City Centre :** No. 521/2, Anna Salai, (Opp. G.R. Complex), Nandanam, Chennai - 600 035.
**Phone / Fax :** (91-44) 2431 5541 / 2431 5542 **E-mail :** velshrinivasa@vsnl.net


Dr. J.ANBU, M.Pharm., Ph.D., D.M.L.T., MBA.
Professor & Head
Department of Pharmacology & Toxicology
School of Pharmaceutical Sciences
Vels University
Pallavaram, Chennai-600 117.

# Bio-Chemical Analysis

## BIO-CHEMICAL ANALYSIS OF TRIAL MEDICINES

**Preparation of Sodium Carbonate extract:** 2 gm of the sample drug is mixed 5 gm of Sodium carbonate and taken in a 100 ml beaker and 20 ml of distilled water is added. The solution is boiled for 10 minutes, cooled and then filtered. The filtrate is called sodium carbonate extract.

| S.No. | Experiment | Observation | Inference |
|---|---|---|---|
| 1 | **Test for Acid Radicals** | | |
| a. | **Test for Sulphate**<br>2 ml of the above prepared extract is taken in a test tube. To this add 2ml of 4% Ammonium oxalate solution. | Absence of White Precipitate | Absent |
| b. | 2ml of extract is added with 2ml of dilute hydrochloric acid until the effervescence ceases off. Then 2ml barium chloride solution is added. | Absence of White Precipitate | Absent |
| 2. | **Test for Chloride:**<br>2ml of extract is added with dilute nitric acid till the effervescence ceases. Then 2ml of silver nitrate solution is added. | white precipitate obtained | Present |

| | | | |
|---|---|---|---|
| 3. | **Test for Phosphate**<br>2ml of the extract is treated with 2 ml of Ammonium molybdate solution and 2ml of concentrated nitric acid. | Absence of Yellow Precipitate | Absent |
| 4. | **Test for Carbonate:**<br>2ml of the extract is treated with 2ml of magnesium sulphate solution. | Absence of white precipitate | Absent |
| 5. | **Test for Sulphide:**<br>1 gm of the substance is treated with 2ml of concentrated Hydrochloric acid | Absence of Rotten egg smelling | Absent |
| 6. | **Test for Nitrate:**<br>1gm of the substance is heated with copper turnings and concentrated sulphuric acid and viewed the test tube vertically down. | Absence of reddish brown gas. | Absent |
| 7.<br>a. | **Test for Fluoride and oxalate**<br>2ml of the extract is added with 2ml of dilute acetic acid and 2ml of calcium chloride solution and heated. | Absence of white precipitate | Absent |
| b. | 5 drops of clear solution is added with 2ml of dilute sulphuric acid and slightly warmed to this, 1 ml of dilute potassium permanganate solution is added. | Absence of KMNO4 solution discolourisation. | Absent |
| 8. | **Test for Nitrite**<br>3 drops of the extract is placed on a filter paper. On that, 2 drops a Acetic Acid and 2 drops of Benzidine solution is placed. | Absence of yellowish red colour | Absent |

| | | | |
|---|---|---|---|
| 9. | **Test for Borate**<br>2 pinches of the substance is made into paste by using Sulphuric acid and Alcohol (95%) and introduced into the blue flame. | Absence of Green tinged flame | Absent |
| **II.** | **TEST FOR BASIC RADICALS** | | |
| 10. | **Test for lead**<br>2 ml of the extract is added with 2 ml of Potassium iodide solution | Absence of Yellow precipitate | Absent |
| 11a | **Test for Copper**<br>One pinch of substance is made into paste with concentrated Hydrochloric acid in a watch glass and introduced into the non luminous part of the flame. | Absence of Bluish green coloured flame. | Absent |
| b. | 2ml of the extract is added with excess of Ammonia solution | Absence of deep blue | Absent |
| 12. | **Test for Aluminium**<br>To the 2 ml of extract. Sodium Hydroxide solution is added in drops to excess. | Absence of White precipitate. | Absent |
| 13a | **Test for Iron**<br>To the 2 ml of extract, 2 ml of Ammonium Thiocyanate solution is added. | Absence of Blood red colour | Absent |
| b. | To the 2 ml of extract, 2 ml of Ammonium Thiocyanate solution and 2 ml of concentrated Nitric Acid is added. | Absence of Blood red colour. | Absent |
| 14. | **Test for Zinc**<br>To the 2 ml of extract Sodium Hydroxide solution is added in | Absence of White precipitate . | Absent |

| | | | |
|---|---|---|---|
| | drops to excess. | | |
| 15. | **Test for Calcium**<br>2 ml of the extract is added with 2 ml of 4% Ammonium Oxalate solution. | White precipitate Obtained | Present |
| 16. | **Test for Magnesium**<br>2ml of extract, Sodium Hydroxide solution is added in drops to excess. | Absence of White precipitate. | Absent |
| 17. | **Test for Ammonium**<br>2 ml of extract few ml of Nessler's Reagent and excess of Sodium Hydroxide solution are added. | Absence of Reddish brown precipitate . | Absent |
| 18. | **Test for Potassium**<br>A pinch of substance is treated with 2 ml of Sodium Nitrite solution and then treated with 2 ml of Cobal Nitrate in 30% glacial Acetic acid. | Yellow precipitate Obtained. | Present |
| 19. | **Test for Sodium**<br>2 pinches of the substance is made into paste by using Hydrochloric acid and introduced into the blue flame. | Absence of Yellow colour flame | Absent |
| 20. | **Test for Mercury**<br>2 ml of the extract is treated with 2 ml of Sodium Hydroxide solution. | Absence of yellow precipitate | Absent |
| 21. | **Test for Arsenic**<br>2 ml of extract is treated with 2 ml of silver Nitrate solution | Absence of Yellow precipitate. | Absent |
| 22. | **Test for Starch**<br>2ml of extract is treated with weak iodine solution | Bluecolour is obtained . | Present |

| | | | |
|---|---|---|---|
| 23. | **Test of reducing Sugar**<br>5ml of Benedicts qualitative solution is taken in a test tube and allowed to boil for 2 minutes and added 10 drops of the extract and again boiled for 2 minutes. The colour changes are noted. | Green colour is obtained. | Present |
| 24. | **Test of the alkaliods**<br>2ml of the extract is treated with 2ml of potassium lodide solution. | Red colour developed | Present |
| 25. | **Test of the proteins**<br>2ml of the extract is treated with 2ml of 5% NaOH ,mix well and add 2 drops of copper sulphate solution. | Violet colour developed | Present |

# RESULTS:

The given sample contains.

Drug Name (Isabgol chooranam) –

a. Chloride

b. Calcium

c. Pottassium

d. Starch

e. Reducing sugar

f. Alkaloids

g. Proteins.

# Toxicological study

## ACUTE AND SUB ACUTE TOXICITY STUDY ON ISABGOL CHOORANAM

### *Animals*

Mice of either sex weighing 25-30g and rats weighing 210-240g were obtained from the animal house of Vels University. The animals were used with the approval of the Institute animal ethics committee and obtained from Vels University, Chennai. They were fed with a balanced standard pellet diet and maintained under standard laboratory conditions, providing 24-28$^0$C temperature, standard light cycle (12 h light, 12 h dark) and water ad libitum. Animals were kept in cages with raised floors of wide mesh to prevent coprophagy. Animal welfare guidelines were observed during the maintenance period and experimentation. The rats were randomly assigned to control and different treatment groups, six animals per group. The animals were acclimatized for one week under laboratory conditions.

### ACUTE TOXICITY STUDY-OECD 425 GUIDELINES

Acute oral toxicity test for the Isabgol Chooranam was carried out as per OECD Guidelines 425. As with other sequential test designs, care was taken to ensure that animals are available in the appropriate size and age range for the entire study. The test substance is administered in a single dose by gavage using a stomach tube or a suitable intubation cannula. The fasted body weight of each animal is determined and the dose is calculated according to the body weight. After the substance has been administered, food was withheld for a further 2 hours in mice. The animals were observed continuously for the first 4 h and then each hour for the next 24 h and at 6 hourly intervals for the following 48 h after administering of the test drug, to observe any death or changes in general behaviour and other physiological activities. Single animals are dosed in sequence usually at 48 h intervals. However, the time interval between

dosing is determined by the onset, duration, and severity of toxic signs. Treatment of an animal at the next dose was delayed until one is confident of survival of the previously dosed animal.

***Observation of toxicity signs:*** General behavior, respiratory pattern, cardiovascular signs, motor activities, reflexes, change in skin and fur, mortality and the body weight changes were monitored daily. The time of onset, intensity, and duration of these signs, if any, was recorded.

**SUB-ACUTE TOXICITY**

In a 28-days sub acute toxicity study, twenty four either sex rats were divided into four groups of 6 rats each. Group I that served as normal control was administered with distilled water (p.o.) while groups II, III and IV were administered daily with the Isabgol Chooranam (p.o.) for 28 days at a dose of 50, 100 and 200mg/kg respectively. The animals were then observed daily for gross behavioural changes and any other signs of subacute toxicity. The weight of each rat was recorded on day 0 and weekly throughout the course of the study, food and water consumption per rat was calculated. At the end of the 28 days they were fasted overnight, each animal was anaesthetized with diethylether, following which they were then dissected and blood samples were obtained by cardiac puncture into heparinised tubes. The blood sample collected from each rat was centrifuged with 3000 X g at $4^{o}$C for 10 min to separate the serum and used for the biochemical assays.

***Hematological and blood biochemical analyses:***

At the end of the study, all animals were kept fasted for 16-18 h and then anesthetized with anesthetic ether on the 28th day. Blood samples for hematological and blood chemical analyses were taken from retro orbital vein. Heparinized blood samples were taken for determining

complete blood count (white blood cell count, differential white blood cell count, platelet count, red blood cell count, hematocrit, and hemoglobin) by semiautomated hematology analyzer. The serum from non-heparinized blood was carefully collected for blood chemistry and enzyme analysis glucose, creatinine, total protein, albumin, total and direct bilirubins, serum glutamate-oxaloacetate transaminase (SGOT), serum glutamate pyruvate transaminase (SGPT), and alkaline phosphatase (ALP)) were automatically determined using autoanalyzer.

***Necropsy:***

All rats were sacrificed after the blood collection. The positions, shapes, sizes and colors of internal organs were evaluated. The Spleen, Testes, Pancrea, Lung, Liver, Brain, Heart, Stomach, Intestine, Bone, Ovary, and Kidney tissues were excised from all rats to visually detect gross lesions, and weighed to determine relative organs' weights and preserved in 10% neutral formalin for histopathological assessment. The tissues were embedded in paraffin, and then sectioned, stained with haematoxylin and eosin and were examined microscopically.

**Statistical analysis**

Values were represented as mean ± SEM. Data were analysed using one-way analysis of variance (ANOVA) and group means were compared using the Tukey-Kramer Multiple Comparison Test using Instat-V3 software. P values $< 0.05$ were considered significant.

**RESULTS AND DISCUSSION**

1) All the animals from control and all the treated dose groups up to 200 mg/kg survived throughout the dosing period of 28 days.

2) No signs of major or significant intoxication were observed in animals from lower to higher dose groups during the dosing period of 28 days.

3) Animals from all the treated dose groups exhibited comparable body weight gain with that of controls throughout the dosing period of 28 days.

4) Food consumption of control and treated animals was found to be comparable throughout the dosing period of 28days.

5) Ophthalmoscopic examination, conducted prior to and at the end of dosing period on animals from control and all the treated dose groups did not reveal any abnormality.

6) Haematological analysis conducted at the end of the dosing period on day 28, revealed no significant abnormalities attributable to the treatment.

7) Biochemical analysis conducted at the end of the dosing period on day 28, revealed no remarkable abnormalities attributable to the treatment.

8) Functional observation tests conducted at termination revealed no abnormalities.

9) Urine analysis, conducted at the end of the dosing period in week 4 and at the end of recovery period in week 6, revealed no abnormality attributable to the treatment.

10) Organ weight data of animals sacrificed at the end of the dosing period was found to be comparable with that of respective controls.

11) Gross pathological examination did not reveal any abnormality.

12) Histopathological examination did not reveal any abnormality.

## CONCLUSION

Based on these findings, no toxic effect was observed upto 200mg/kg of Isabgol Chooranam treated via oral route over a period of 28 days. So, it can be concluded that the Isabgol Chooranam can be prescribed for therapeutic use in human with the dosage recommendations of upto 200mg/kg. body weight p.o.

## REFERENCES


1. Benjamin, M.N., 1978.Outline of Veterinary Clinical Pathology. University Press, IOWA, USA., pp:229-232.
2. OECD (testing guideline, 407), 1995. Repeat dose 28 days oral toxicity study in rodents; In Guidance document for the development of OECD guideline for testing of chemicals Environmental monographs No 76; http//www.oecd.ord/document/30/0.2340,en??2649-34377-19166381111, 00html.
3. OECD Principles on Good Laboratory Practice, 2001. In: Handbook, Good Laboratory Practice (GLP), Quality Practices for Regulated non Clinical Research and Development TDR PRD/GLP/01.2.
4. Organization for Economic Cooperation Development (OECD) Guideline, 425,2000. Guideline Document on Acute Oral Toxicity. Environmental Health and Safety Monograph Series on Testing and Assessment No. 24.
5. Ringler, D.H. and L.Dabich, 1979. Haematology and Clinical Biochemistry. In: The Laboratory Rat. Baker, J., J.R. Lindsey and S.H.Weisbroth (Eds.), Academic Press London, 1: 105-118.

**Table 1: Dose finding experiment and its behavioral Signs of Toxicity**

| No | Dose mg/kg | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 500 | + | - | - | + | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2 | 1000 | + | - | - | + | - | + | - | - | + | - | - | - | - | - | - | - | + | - | + | - |
| 3 | 2000 | + | - | - | + | - | + | + | - | + | - | - | - | + | - | - | - | + | + | + | - |

1. Alertness 2. Aggressiveness 3. Pile erection 4. Grooming 5. Gripping 6. Touch Response 7. Decreased Motor Activity 8. Tremors 9. Convulsions 10. Muscle Spasm 11. Catatonia 12. Muscle relaxant 13. Hypnosis 14. Analgesia 15.Lacrimation 16. Exophthalmos 17. Diarrhoea 18. Writhing 19. Respiration 20. Mortality

**Table 2. Body wt (g) of albino rats exposed to *Isabgol Chooranam* for 28days**.

| Dose (mg/kg/day) | Days | | | | |
|---|---|---|---|---|---|
| | 1 | 7 | 14 | 21 | 28 |
| Control | 210.50±6.52 | 212.16±6.40 | 215.48±5.42 | 221.52±8.00 | 223.11±5.88 |
| 50 | 215.71±6.43 | 218.20±5.18 | 220.51±5.70 | 226.64±7.02 | 226.50±6.00 |
| 100 | 213.42±5.45 | 216.14±6.18 | 220.00±6.61 | 224.10±7.10 | 227.72±7.12 |
| 200 | 212.10±6.25 | 217.28±5.42 | 219.23±6.49 | 222.22±6.43 | 225.25±7.23 |

Values are mean of 6 animals ± S.E.M. (Dunnet's test). $^{ns}P>0.05$.

**Table 3. Food (g/day) intake of albino rats exposed to *Isabgol Chooranam* for 28days.**

| Dose (mg/kg/day) | Days (gms/rats) | | | | |
|---|---|---|---|---|---|
| | 1 | 7 | 14 | 21 | 28 |
| Control | 47.06±2.55 | 48.48±2.51 | 46.24±2.50 | 45.82±2.54 | 47.20±3.42 |
| 50 | 46.24±2.17 | 46.43±2.40 | 46.40±2.46 | 49.14±2.90 | 48.52±3.05 |
| 100 | 44.34±2.28 | 45.00±2.92 | 44.25±2.45 | 45.18±3.21 | 46.04±3.00 |
| 200 | 45.60±2.55 | 45.20±2.18 | 46.51±2.82 | 45.31±2.40 | 45.14±3.14 |

Values are mean of 6 animals ± S.E.M. (Dunnet's test). $^{ns}P>0.05$.

**Table 4. Water (ml/day) intake of rats exposed to *Isabgol Chooranam* for 28days.**

| Dose (mg/kg/day) | Days(ml/rat) | | | | |
|---|---|---|---|---|---|
| | 1 | 7 | 14 | 21 | 28 |
| Control | 52.00±2.85 | 52.20±3.32 | 54.20±3.12 | 52.20±3.14 | 51.22±3.22 |
| 50 | 53.10±2.63 | 50.12±3.04 | 45.21±4.02 | 46.50±3.00 | 44.52±2.48 |
| 100 | 49.17±2.18 | 42.25±3.72 | 45.48±3.34 | 42.10±2.92 | 41.12±3.28 |
| 200 | 54.30±3.52 | 54.72±3.00 | 52.42±3.82 | 48.20±3.12 | 47.32±3.62 |

Values are mean of 6 animals ± S.E.M. (Dunnet's test). $^{ns}P>0.05$.

**Table.5.Hematological parameters after 28days treatment with *Isabgol Chooranam* in rats.**

| Parameter | Control | 50mg/kg | 100mg/kg | 200 mg/kg |
|---|---|---|---|---|
| **Red blood cell ($mm^3$)** | 7.02±0.71 | 7.92±0.62 | 7.18±0.75 | 8.00±0.60 |
| **HB (%)** | 15.21±0.43 | 15.10±0.41 | 15.56±0.42 | 15.00±0.44 |
| **Leukocyte ($x10^6$/mL)** | 10.00±1.6 | 10.35±2.2 | 10.02±2.1 | 10.36±1.32 |
| **Plateletsin lakhs/cu.mm** | 1.25±0.49 | 1.62±0.54 | 1.72±0.62 | 1.25±0.56 |
| **MCV (gl)** | 54.42±5.20 | 53.12±4.22 | 54.00±5.24 | 55.10±4.80 |
| **Neutrophil** | 5.45±1.23 | 5.42±1.21 | 5.18±0.96 | 5.14±3.72 |
| **Lymphocyte** | 92.13±2.82 | 91.70±3.18 | 93.20±3.22 | 92.30±3.12 |
| **Monocyte** | 2.2±0.30 | 2.0±0.23 | 2.21±0.24 | 2.30±0.28 |
| **Eosinophil** | 1.00±0.00 | 1.0±0.22 | 1.0±0.11 | 1.00±0.11 |
| **Basophil** | 0 | 0 | 0 | 0 |
| **ESR(mm)** | 1±00 | 1±00 | 1±00 | 1±00 |
| **PCV** | 45.30±2.42 | 45.26±2.12 | 45.04±3.02 | 45.42±3.42 |

Values are mean of 6 animals ± S.E.M. (Dunnet's test). $^{ns}P>0.05$.

**Table 6. Effect of treatment with *Isabgol Chooranam* biochemical parameters.**

| Dose (mg/kg) | Control | 50 mg/kg | 100 mg/kg | 200 mg/kg |
|---|---|---|---|---|
| **Total Bilirubin (mg/dL)** | 0.210±0.05 | 0.210±0.06 | 0.212±0.05 | 0.214±0.04 |
| **Bilirubin direct (mg/dL)** | 0.1±0.04 | 0.1±0.05 | 0.1±0.04 | 0.1±0.05 |
| **Bilirubin indirect(mg/dL)** | 0.1±00 | 0.1±00 | 0.1±00 | 0.1±00 |
| **ALP (U/L)** | 376.42±11.10 | 370.12±10.30 | 374.12±10.00 | 372.1±12.32 |
| **SGOT (U/L)** | 164.20±6.20 | 162.16±6.82 | 158.80±5.40 | 159.21±6.78 |
| **SGPT(U/L)** | 45.8±3.42 | 45.2±3.24 | 45.00±2.84 | 46.22±3.14 |
| **Total Protein(g/dl)** | 10.00±1.00 | 9.88±0.90 | 9.54±0.87 | 9.28±0.96 |
| **Albumin(g/dl)** | 3.70±0.28 | 3.92±0.44 | 3.40±0.30 | 3.42±0.32 |
| **Globulin(g/dl)** | 6.00±0.15 | 5.85±0.16 | 5.58±0.20 | 5.80±0.26 |

Values are mean of 6 animals ± S.E.M. (Dunnet's test). $^{ns}P>0.05$ Vs. control

**Table-7 RFT**

| Dose (mg/kg) | Control | 50 mg/kg | 100 mg/kg | 200 mg/kg |
|---|---|---|---|---|
| **Urea(mg/dL)** | 56.20±1.37 | 55.74±3.65 | 55.42±2.45 | 54.82±2.30 |
| **Creatinine (mg/dL)** | 0.77±0.05 | 0.76±0.05 | 0.77±0.06 | 0.78±0.05 |
| **Uric acid (mg/dL)** | 1.5±0.14 | 1.6±0.15 | 1.6±0.14 | 1.6±0.18 |
| **Na m.mol** | 140.50±5.52 | 140.42±4.00 | 140.21±5.22 | 141.18±5.02 |
| **K m.mol** | 20.15±2.81 | 19.58±1.82 | 20.10±1.68 | 20.52±2.24 |
| **Cl m.mol** | 101.05±4.42 | 101.00±4.18 | 99.48±4.42 | 100.00±5.10 |

**Table-8. Lipid Profile**

| Dose (mg/kg) | Control | 50 mg/kg | 100 mg/kg | 200 mg/kg |
|---|---|---|---|---|
| **Total cholestrol(mg/dL)** | 41.60±2.52 | 41.28±2.40 | 40.11±3.12 | 42.00±3.02 |
| **HDL(mg/dL)** | 13.40±1.54 | 13.22±1.47 | 13.40±1.80 | 13.40±2.13 |
| **LDL(mg/dL)** | 42.56±2.48 | 44.52±3.16 | 45.43±3.02 | 44.22±3.28 |
| **VLDL(mg/dl)** | 16.30±2.28 | 15.72±2.53 | 16.00±1.42 | 15.00±1.20 |
| **Triglycerides (mg/dl)** | 86.42±3.02 | 85.62±2.42 | 85.20±3.32 | 86.42±2.42 |
| **TC/HDL ratio (g/dl)** | 3.52±0.25 | 3.60±0.28 | 3.55±0.30 | 3.45±0.28 |
| **Blood glucose(mg/dl)** | 127.30±6.00 | 126.02±5.20 | 126.10±5.00 | 124.88±4.56 |

Values are mean of 6 animals ± S.E.M. (Dunnet's test). $^{ns}P>0.05$.Vs. control

**Table-9 Urine Analysis**

| **Parameters** | **Control** | **50 mg/kg** | **100 mg/kg** | **200 mg/kg** |
|---|---|---|---|---|
| **Colour** | Yellow | Yellow | Yellow | Yellow |
| **Transparency** | Clear | Slightly turbid | Slightly cloudy | Slightly turbid |
| **Specific gravity** | 1.010 | 1.010 | 1.010 | 1.010 |
| **PH** | >7.2 | >8.0 | >8.0 | >9.0 |
| **Protein** | Nil | 3+ | 3+ | 3+ |
| **Glucose** | Nil | Nil | Nil | Nil |
| **Bilirubin** | -ve | -ve | -ve | -ve |
| **Ketones** | -ve | +ve | +ve | +ve |
| **Blood** | Absent | Absent | Absent | Absent |
| **Urobilinogen** | Normal | Abnormal | Abnormal | Abnormal |
| **Pus cells** | 0-cells/HPF | 1-cell/HPF | 2-cells/HPF | 1-cell/HPF |
| **RBCs** | Nil | Nil | 0-1cells/HPF | Nil |
| **Epithelial cells** | Nil | 1-cell/HPF | Nil | 1-cell/HPF |
| **Crystals** | Nil | Nil | Nil | Nil |
| **Casts** | Nil | Nil | Nil | Nil |
| **Others** | Bacteria seen | Bacteria seen | Bacteria seen | Bacteria seen |

**Table 10. Effect of oral administration of *Isabgol Chooranam* on organ weight**

| Dose (mg/kg) | Control | 50 mg/kg | 100 mg/kg | 200 mg/kg |
|---|---|---|---|---|
| **Liver (g)** | 5.21±0.14 | 5.28±0.12 | 4.98±0.10 | 5.12±0.14 |
| **Heart (g)** | 0.60±0.04 | 0.60±0.05 | 0.57±0.04 | 0.58±0.04 |
| **Lung (g)** | 1.45±0.15 | 1.46±0.12 | 1.48±0.14 | 1.50±0.14 |
| **Spleen (g)** | 0.65±0.05 | 0.65±0.04 | 0.64±0.04 | 0.65±0.05 |
| **Ovary (g)** | 1.70±0.14 | 1.72±0.15 | 1.78±0.18 | 1.74±0.15 |
| **Testes (g)** | 1.47±0.10 | 1.49±0.12 | 1.56±0.15 | 1.54±0.15 |
| **Brain (g)** | 1.57±0.15 | 1.56±0.13 | 1.56±0.14 | 1.55±0.14 |
| **Kidney (g)** | 0.72±0.04 | 0.71±0.04 | 0.70±0.04 | 0.71±0.05 |
| **Stomach (g)** | 1.35±0.13 | 1.36±0.10 | 1.35±0.11 | 1.35±0.10 |

Values are mean of 6 animals ± S.E.M. (Dunnet's test). $^{ns}P>0.05$.Vs control

# HISTOPATHOLOGY of toxicological study
## Drug name: isabgol chooranam

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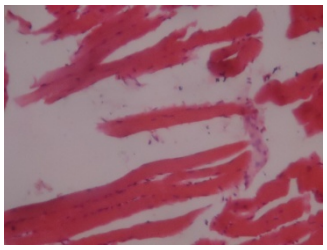
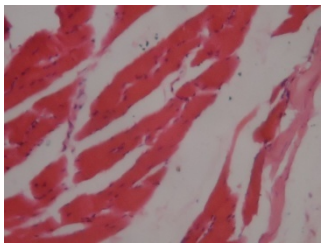
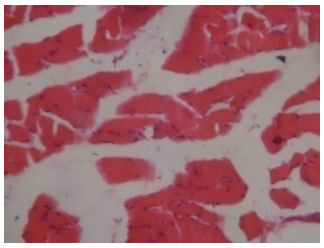
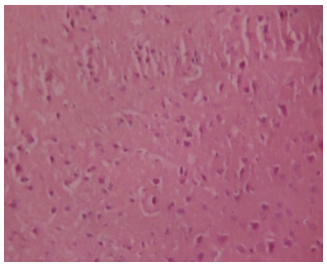
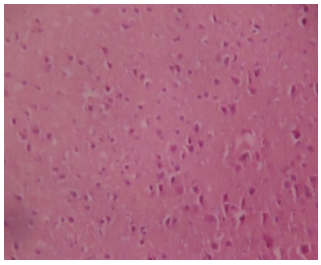
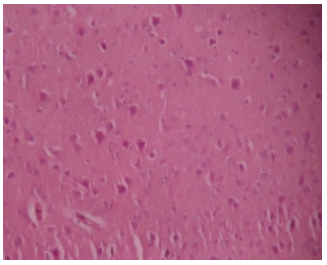
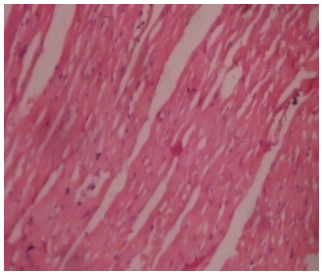
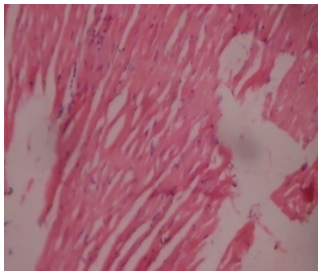
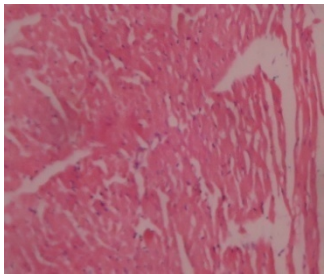
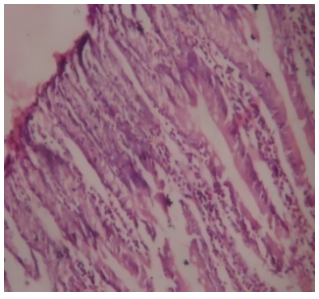
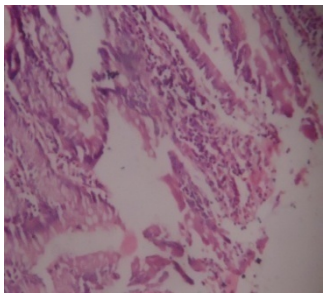
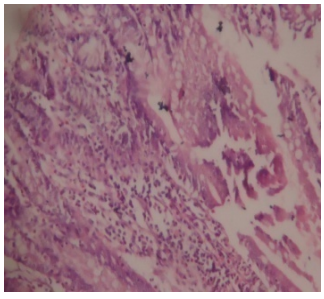
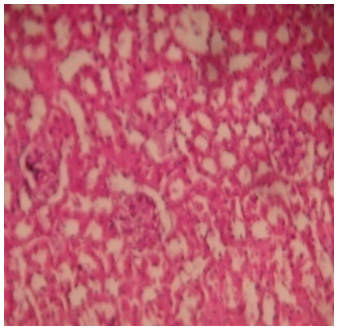
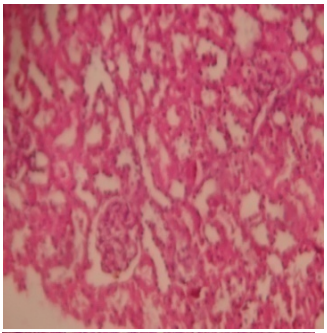
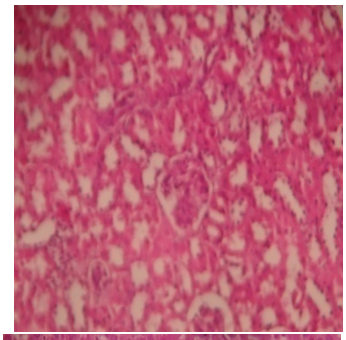
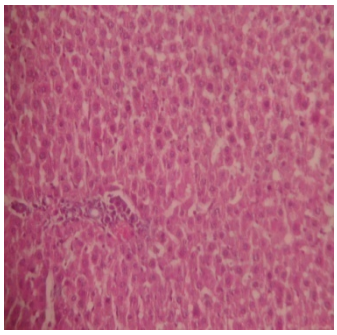
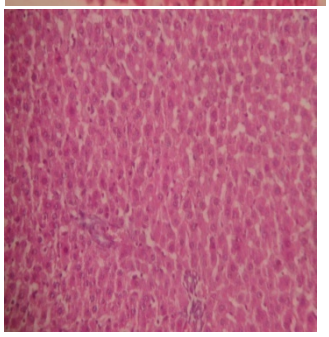
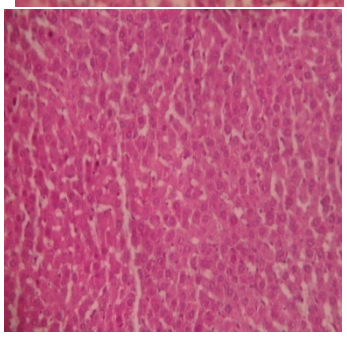
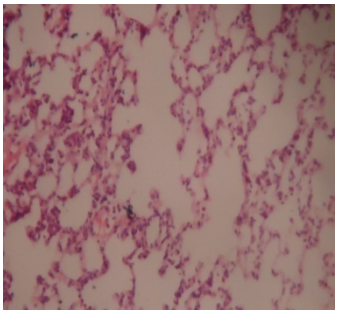
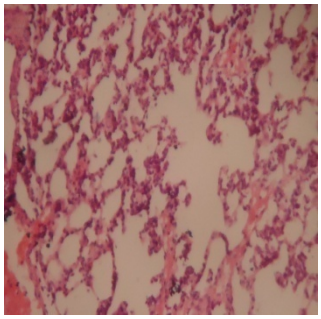
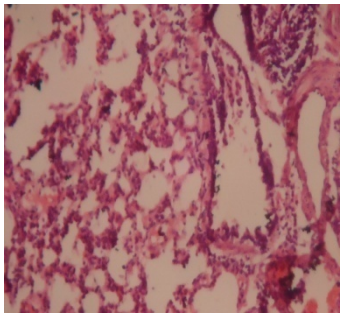
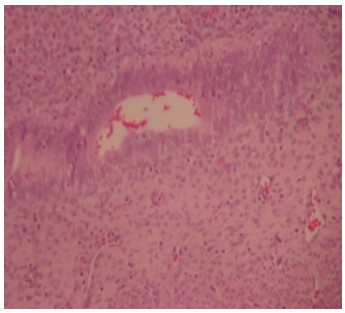
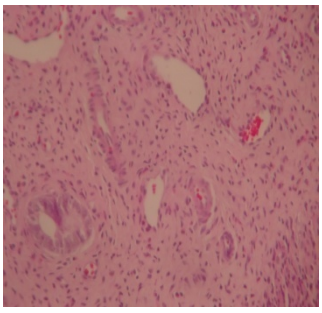
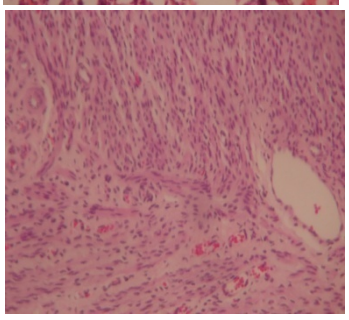
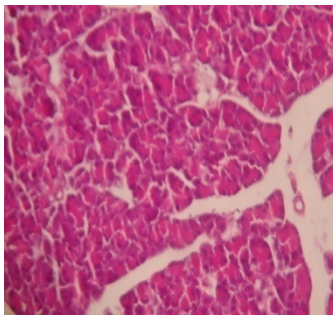
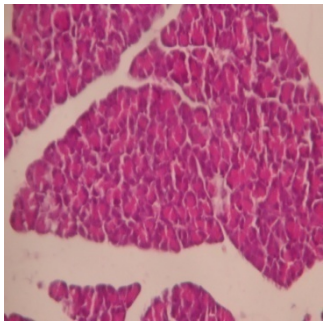
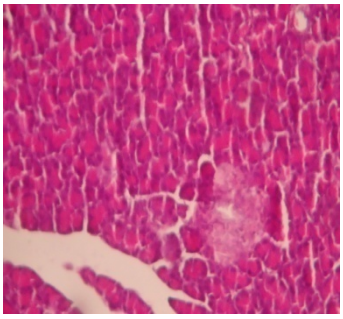
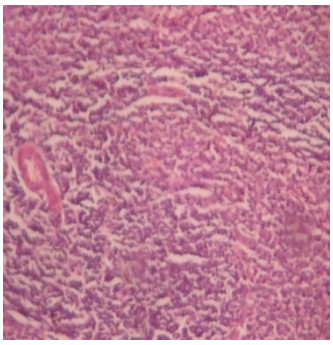
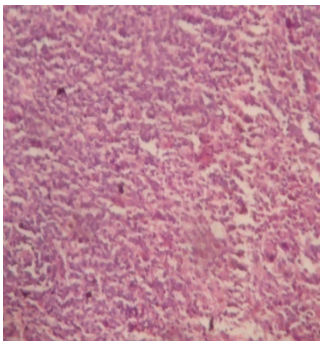
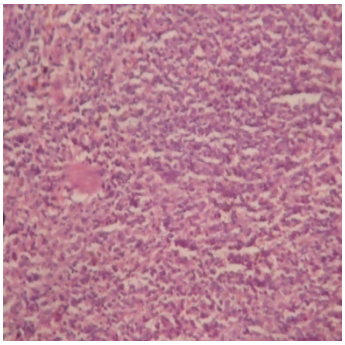
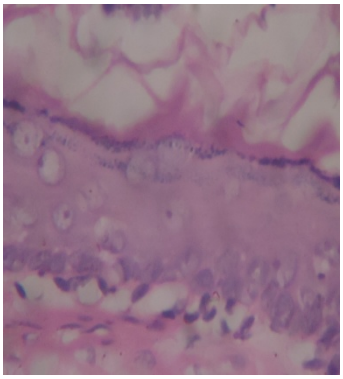
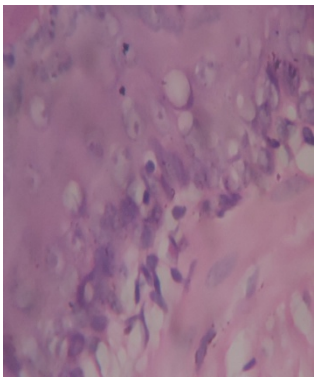
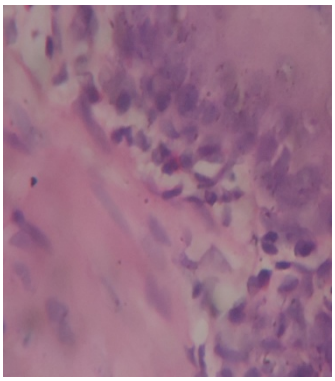
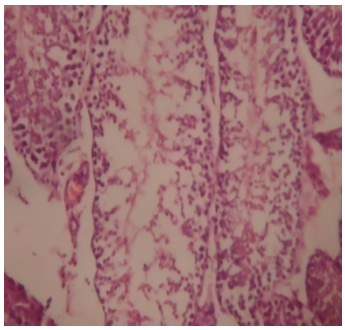
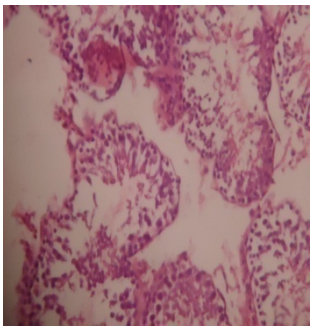
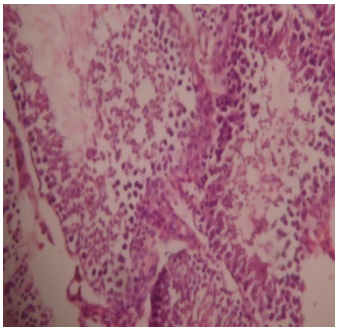
| **BONE** |  |  |  |
| **BRAIN** |  |  |  |
| **HEART** |  |  |  |
| **INTESTINE** |  |  |  |

| | 50 MG | 100 MG | 200 MG |
|---|---|---|---|
| **KIDNEY** |  |  |  |
| **LIVER** |  |  |  |
| **LUNGS** |  |  |  |
| **OVARY** |  |  |  |

| | 50 MG | 100 MG | 200 MG |
|---|---|---|---|
| **PANCREAS** |  |  |  |
| **SPLEEN** |  |  |  |
| **STOMACH** |  |  |  |
| **TESTIS** |  |  |  |

# Pharmacological study

## SPERMATOGENIC ACTIVITY OF ISABGOL CHOORANAM AGAINST 2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN INDUCED OLIGOSPERMIC RATS

## INTRODUCTION

Infertility is the failure of a couple to conceive a pregnancy after trying to do so for at least one full year. In primary infertility, pregnancy has never occurred. In secondary infertility, one or both members of the couple have previously conceived, but are unable to conceive again after a full year of trying. Approximately 20% of couples struggle with infertility at any given time. Infertility has increased as a problem over the last 30 years. Some studies blame this increase on social phenomena, including the tendency for marriage and starting a family to occur at a later age. For women, fertility decreases with increasing age:

- ✓ Infertility in married women ages 16–20 = 4.5%.
- ✓ Infertility in married women ages 35–40 = 31.8%.
- ✓ Infertility in married women over the age of 40 = 70%.

Presently, individuals often have several sexual partners before they marry and try to have children. This increase in numbers of sexual partners has led to an increase in sexually transmitted diseases. Scarring from these infections, especially from infection of the female reproductive organs seems to be in part responsible for the rise in infertility. Furthermore, use of some forms of the contraceptive called the intrauterine device (IUD) has contributed to an increased rate of pelvic inflammatory disease, with subsequent scarring. A study in 2001 found that copper IUDs have probably been wrongfully blamed for tubal infertility, while infection from the sexually transmitted disease chlamydia was likely the cause.

**Causes & symptoms**

Unlike most medical problems, infertility is an issue requiring the careful evaluation of two separate individuals, as well as an evaluation of their interactions with each other. In about 3–4% of couples, no cause for their infertility will be discovered. About 40% of the time, infertility is due to a problem with the male; about 40% of the time, infertility is due to the female; and about 20% of the time, there are fertility problems with both the male and the female.

The main factors involved in causing infertility include:

- male problems: 35%
- ovulation problems: 20%
- tubal problems: 20%
- endometriosis: 10%
- cervical factors: 5%

**Male factors**

Male infertility can be caused by a number of different characteristics of the sperm. To check for these characteristics, a sample of semen is obtained and examined under the microscope (semen analysis). Four basic characteristics are usually evaluated:

- Sperm count refers to the number of sperm present in a semen sample. The normal number of sperm present in just 1 ml of semen is over 20 million. A man with only 5–20

million sperm is considered subfertile and a man with fewer than 5 million sperm is considered infertile.

- Sperm are also examined to see how well they swim (sperm motility) and to be sure that most have normal structure.
- Not all sperm within a specimen of semen will be perfectly normal. Some may be immature, and some may have abnormalities of the head or tail. A normal semen sample will contain no more than 25% abnormal forms of sperm.
- Volume of the semen sample is important. An abnormal amount of semen could affect the ability of the sperm to successfully fertilize an ovum.

Men can be born with testicles that have not descended properly from the abdominal cavity into the scrotal sac, or may be born with only one instead of the normal two testicles. Testicle size can be smaller than normal. The presence of abnormally large veins (varicocele) in the testicles can increase testicular temperature, which decreases sperm count. History of having been exposed to various toxins, drug use, excess alcohol use, use of anabolic steroids, certain medications, diabetes, thyroid problems, or other endocrine disturbances can have direct effects on the formation of sperm (spermatogenesis). Problems with the male anatomy can cause sperm to be ejaculated not out of the penis, but into the bladder; and scarring from past infections can interfere with ejaculation.

**Treatment**

Conventional treatment for infertility usually involves invasive and, expensive procedures. There are many alternative treatments available that can increase the chance of conception. Some have been proven effective in clinical studies. General measures to increase

fertility include monitoring ovulation and timing intercourse (optimal chance for conception is within six days prior to and including the day of ovulation); and quitting smoking, excessive drinking, and drug use. To improve sperm quality, men can wear boxer shorts instead of briefs. Both men and women can increase fertility by eating a well-balanced diet. Good food choices include legumes (especially soy), dark-colored vegetables, fruits, seeds, nuts, and sufficient good quality protein including meat, fish, and eggs. Some people think that refined sugar, processed cheeses, foods made with white flour, and chemical preservatives should be avoided. Adequate sleep is also important. The present study was conducted to evaluate the possibility of using Isabgol Chooranam as a therapeutic agent to treat spermatogenic disorders in the animal models.

## MATERIALS AND METHODS

### Chemicals

The 2,3,7,8-Tetrachloro dibenzo-p-dioxin and necessary chemicals and reagents were obtained from Sigma chemicals. All other solvents and Analytical Kits were of analytical grade and obtained from qualigen fine chemicals and Artek laboratories.

### Animals

Adults male rats weighing between 152-167g and albino mice weighing between 25-34g (For acute toxicity study) were maintained in a well ventilated animal house under standard condition of humidity, temperature and a constant 12 hour light:12 hour dark lighting schedule. The animals were housed in clear polypropylene cages. The animals were maintained with standard pellet feed (Sai Durga Feeds and Foods, Bangalore, India) and water ad libitum. The health, normal behaviour and reproductive status of the animals were assessed and only healthy

animals were selected for the experiment. All experimental procedures described were reviewed and approved by the Institutional Animal Ethical Committee. (XIII/VELS/PCOL/27/2000/CPCSEA/IAEC/08.08.2012).

## Drug Stock solution

The powdered form of Isabgol Chooranam was mixed uniformly in 2% CMC and made into uniform suspension to achieve 200mg/ml as main stock solution and used in this study.

### Acute oral toxicity study

The acute oral toxicity study was carried out as per the guidelines set by Organization for Economic Co-operation and Development (OECD), revised draft guidelines 425 (Up and Down method) received from Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA). The test substances were administered in a single dose using a gastric intubation tube after fasting for 3 to 4 h.

Since there was no information on the substance to be tested, starting dose was 2000 mg/kg body weight up to 5000 mg/kg body weight. Animals were observed initially after dosing at least once during the first 30 min, periodically during the first 24 h. In all cases death was observed within first 24h. Attention was also given to observations of behavioral changes and toxic symptoms like tremors, dyspnoea, writhing and convulsions etc.

## Evaluation Of Spermatogenic activity

### *Animal grouping and Treatment*

Twenty four adult male rats were randomly divided into four groups of six animals each. Group 1 (control) was administered with the vehicle (2% CMC suspension) while groups 2 and 3

were given suspension of Isabgol Chooranam at 50mg/kg and 100mg/kg. One rat was sacrificed to ensure the oligospermic induction at the beginning of the experiment ie after one week of TCDD injection. Two rats from each treatment group were randomly sacrificed after 14 days of Isabgol Chooranam administration while the remaining rats treatment were continued up to 28 days. Treatment was done daily using oral dosing needle and twenty four hours after the last dose, blood was collected and the animals were sacrificed. All procedures regarding handling of the test animals were in accordance with the existing CPCSEA and IAEC guidelines.

**Induction of oligospermia by TCDD in rats**

Initially, rats were injected with 40μg TCDD/kg i.p. At one week after TCDD exposure, a rat from each group was selected and tested for induction of oligospermia and after ensuring the oligospermic conditions the study was proceded furtherly.

**Blood sample and organ collection**

After the last dosing of Isabgol Chooranam, all the animals were sacrificed by employing euthenesia procedure and the testes, epididymides, vas deferens, seminal vesicles and ventral prostates were identified, dissected out, blotted free of blood and cleared of connective tissue or fat. The organs were weighed immediately using a electronic digital balance. Blood samples were collected by retro-orbital puncture into anticoagulant pre-coated and also in plain sterile eppendorff tubes and allowed to clot at room temperature. Serum samples were separated by centrifugation at 3000 rpm for 10 min and stored at -20°C until testosterone assay. Anticoagulant added blood samples were used for the studying haematological parameters

**Sperm collection and Measurement of sperm parameters**

The rats were anaesthetized with anesthetic ether and sacrificed after the last day of administration and weighed for the essential reproductive organs, such as testis, caudal epididymis, seminal vesicle and prostate glands. A scrotal incision was made to exteriorize the

testis and epididymides. The epididymides were carefully dissected out of the testes and blotted free of blood. To prepare sperm suspension, epididymal sperm were obtained by mincing cauda epididymis of each rat in pre-warmed beaker containing 2 ml of physiological saline (maintained at 37°C). Several incisions were made on it to allow sperm swim out.

Sperm characteristics were determined according to the standard protocols derived by the previous investigators in this research area. Sperm motility was also assessed immediately by counting both motile and immotile spermatozoa per unit area at the 40x magnification. Sperm count was done using the improved Neubauer's haemocytometer under the light microscope at 100x magnification. The count was expressed as million/ml of suspension. Sperm viability was assessed using eosin-nigrosin test. The percentages of unstained (alive) and stained (dead) spermatozoa were calculated by counting 100 spermatozoa randomly per sample. Morphological appearance of normal and abnormal spermatozoa was determined by examining stained smears under the oil immersion (100x) and their percentages were calculated.

**Testosterone Assay**

Blood samples were spun at 2500rpm for 10 minutes in a table top centrifuge. The serum samples obtained were analyzed to determine the concentration of testosterone. The analysis was carried via the tube-based enzyme immunoassay method as described in the kit.

**Collection of tissues and histological analysis**

The testes were collected and immediately fixed in Bouins fluid for 6 h and transferred to 70% alcohol for histological processing. And following fixation of the testes from both control and test animals, tissue sections were processed by dehydration in 95% and absolute alcohol,

cleared in xylene and embedded in pure clean molten paraffin wax from which blocks of tissues were made for sectioning. Ribbon slices of about 5.0μm in thickness were made with the aid of a microtome and the sections picked with slides which were dried in oven. The slices were then stained with Haemotoxylin and Eosin, and then mounted using DPX onto a light microscope (magnification 40x) for histopathological and morphological changes. The changes observed were recorded and photomicrographs of the most prominent pathological alterations.

**Statistical Analysis**

The results were analyzed by one-way analysis of variance using INSTAT version 3 for Windows. Significant differences within group variables were determined by Tukey's multiple comparison test. Results were considered significant at 5% level of probability ($P < 0.05$). The data were presented as mean ± SEM.

**RESULTS AND DISCUSSION**

In the toxicity study, No specific signs of toxicity were seen in any of the animals except mild diarrhoea. Hence as per the guideline the one tenth & fifth of maximum tolerable doses were selected for further pharmacological study. However, most of the animals exhibited calmness; improve appetite for food and water and general well-being during the administration of Isabgol chooranam upto 500 and 1000mg/kg dose orally.

Male fertility requires the production by the testis of large numbers of normal spermatozoa through a complex process known as spermatogenesis. This process can be subdivided into three major steps: (i) the multiplication of spermatogonia by the process of mitosis; (ii) meiosis, which reduces the chromosome number from diploid to haploid and

commences with the entry of type B spermatogonia into the prophase of the first meiotic division. These cells, now called primary spermatocytes, divide to form secondary spermatocytes, and then divide again to form round spermatids; (iii) the successful transformation of the round spermatid into the complex structure of the spermatozoon, this phase being called spermiogenesis.

Each of these steps represents a key element in the spermatogenic process. Defects which occur in any of them can result in the failure of the entire process and lead to the production of defective spermatozoa and reduction or absence of sperm production. It is therefore essential that our understanding of these processes is expanded to provide information concerning the regulatory mechanisms. Oral administration of the Isabgol chooranam for four weeks showed that the body weights increased significantly ($P < 0.05$) from $164.20 \pm 2.06$ and $188.60 \pm 1.33$ to $168.36 \pm 1.86$ and $184.52 \pm 2.64$, respectively. Significant increases ($P< 0.01$) in weights of testes, epididymides, ventral prostrate, seminal vesicles and vas deferens were observed in the treated groups compared with the control.

The sperm count was significantly ($P< 0.01$) higher in test drug Isabgol chooranam groups than the control in a dose related manner. In addition, the sperm motility and morphology of the test groups were also significantly ($P<0.01$) higher than the control. Furthermore, the percentages of abnormal sperm cells in treatment groups were reduced compared to the oligospermic control but it was statistically not significant. Similarly, Significant ($P>0.01$) increase in testosterone level of the treated group compared to control. Moreover, the low dose testosterone level was also significantly different from the control. TCDD and its related congeners have been shown to act as developmental and reproductive toxicants, which reduce testicular and accessory sex organ weights, alter testicular morphology, and decrease sperm production. In the control group, histopathologic examinations

of seminiferous tubules showed the usual arrangement of Leydig's cell, Sertoli cells, and intracellular spaces.

However, in TCDD-treated rats, cell differentiation, including that of spermatogonia, tended to be lower than in controls, maturation levels of spermatocytes and spermatids were also lower. In TCDD treated animals, all sperm developmental stages had almost completely returned to the control level, and sperm development was higher than in TCDD treated animals. Significant differences were found in the mean number of RBC and Hb level in Isabgol chooranam treated rats compared to control. But, a significant decrease in levels of blood sugar, serum cholesterol and serum phospholipids in the rats treated with Isabgol chooranam at the both dose levels were observed when compared to control. The result indicates that Isabgol chooranam affects testicle of rats, its increase the weight of this organs, there are significant increase in sperm cells concentration, on the other hand, increased sperm cell count but percentage of motile sperms was observed in only higher dose group animals.

Isabgol chooranam gave significant increase of the testicle mass. The round spermatid, which arises from the second meiotic division, undergoes a series of complex cytological events which transform it into the spermatozoon. This process consists of (i) nuclear condensation and movement of the nucleus to the periphery of the cell; (ii) formation of a modified lysosome known as the acrosome, which becomes attached to the surface of the nucleus in opposition to the cell membrane; (iii) flagellar formation which includes the development of a core of microtubules, the axoneme, which arises from one of the centrioles of the round spermatid.

In the Isabgol chooranam treated groups, there was a significant excess in the number of primary and secondary spermatocytes and round spermatids. The testis section of normal animals showed clear histological texture. The diameter of semniferous tubules varied within a range.

The tubules having maximum diameter, were not abundant and well within range. Sertoli cells had many cytoplasmic processes which were normal in size. Spermatozoa were embedded in the sertoli cells and showed normal cytoplasmic granulation. In the spermatogesis process, the formation of the axoneme, a series of equally spaced doublet microtubules surrounding two single central microtubules, occurs in the cytoplasm adjacent to the Golgi complex, but later in spermiogenesis, this structure becomes lodged at the abacrosomal pole of the nucleus through a complex articulation forming the neck of the spermatozoon.

Later in the formation of the tail, the axoneme is modified by the development of a series of nine electron dense fibres, termed the outer dense fibres, in the region of the mid-piece of the spermatozoon and distally by the formation of the fibrous sheath in the region of the principal piece; (iv) finally, following the completion of these events, the spermatid sheds a large part of its cytoplasm as the residual body which is phagocytosed by the Sertoli cell. Leydigs cells had normal nuclear size. Luminal part of the tubule were normal in number with bundles of spermatozoa.

## CONCLUSION

The results obtained in the present study strongly confirms the positive beneficial effects on male reproductive system by Increased number of spermatozoa in semniferous tubules and which is evident by increase in spermatogenic elements as compared to control.

## REFERENCES

1. Abdel-Magied, E.M., Abdel-Rahman H.A., and Harraz, F.M., The effect of aqueous extracts of Cynomorium coccineum and Withania somnifera on testicular development in immature Wistar rats. J. Ethnopharm. 75, 1-4 (2001).

2. Aitken RJ, Best FSM, Warner P, Templeton A (1984). A prospective study of the relationship between semen quality and fertility in the case of unexplained infertility. J. Androl. 5: 297-303.
3. Boitani, C, Stefanini, M., Fragale, A. et al. (1995) Activin stimulates Sertoli cell proliferation in a denned period of rat testis development. Endocrinology, 136, 5438-5444.
4. Burfeind, P., Belgardt, B., Szpirer, C. et al. (1993) Structure and chromosomal assignment of a gene encoding the major protein of rat sperm outer dense fibres. Eur. J. Biochem., 216, 497-505.
5. Byskov, A.G., Anderson, C.Y., Nordholm, L. et al. (1995) Chemical structure of sterols that activate oocyte meiosis. Nature, 374, 559-562.
6. Carlsen, E.L., Giwercmn, A., and Keiding, N., Evidence for decreasing quality of semen during past 50 years. Br. Med. J. 305, 609-613 (1992).
7. Chauhan NS, Rao CV, Dixit VK. 2007. Effect of Curculigo orchioides rhizomes on sexual behaviour of male rats. Fitoterapia 78:530-534.
8. Chavan NS and Dixit VK, 2008. Spermatogenesis activity of Rhizomes of Curculigo orchioides, Gaertn on male rats. Int J. Appl . Res nat prod. 1(2): 26031
9. de Kretser, D.M. and Kerr, J.B. (1994) The cytology of the testis. In Knobil, E. and Neill, J.D. (eds), Physiology & Reproduction. Raven Press, New York, pp. 1177-1290.
10. Dufau M, Veldheis J, Fraiali F, Johnson M, Catt K. Mode of bioactive LH secretion in man. J Clin Endo Meta. 1983; 57:993.

11. Hadziselimovic F and Herzog B, 1997. The treatment with a luteinizing hormone releasing hormone Analogue after successful Orchiopexy Markedly Improves the change of fertility later in life. The Journal of urol., 158(3): 1193-1195
12. Hall P, Charpannier C, Nakamura M, Gabbioni G. Role of microfilaments in response of Leydig cell to LH. J St Biochem.1979; 11:1361.
13. Hess, R. A. & Carnes, K. The role of estrogen in testis and the male reproductive tract: a review and species comparison. Anim. Reprod., 1:5-30, 2004.
14. Hornstein, Mark D., and Daniel Schust. "Infertility." In Novak's Gynecology, edited by Jonathan S. Berek. Baltimore: Williams and Wilkins, 1996.
15. Huang, H. F. S.; Marshall, G. R.; Rosenberg, R. & Nieschlag, E. Restoration of spermatogenesis by high levels of testosterone in hypophysectomized rats after long-term regression. Acta Endocrinol. (Copenh), 116:433-44, 1987.
16. Johnson, L., Dickerson, R., Safe, S.H., Nyberg, C.L., Lewis, R.P., and Welsh, T.H., Reduced Leydig cell volume and function in adult rats exposed to 2,3,7,8-tetrachlorodibenzo-p-dioxin without a significant effect on spermatogenesis. Toxicology 76, 103-118 (1992).
17. Kamtchouing P, Fandio GYM, Dimo T, Jatsa HB. (2002). Evaluation of androgenic activity of Zingiber officinale and pentadiplandra brazzeana in male rats. Asian J Androl. 4:299-301.
18. Kretser, D.M. (ed.), Molecular Biology of the Male Reproductive System. Academic Press, San Diego, pp. 311-326.

19. Leigh OO, Fayemi OE (2008). Effects of crude aqueous extract of Ocimum gratissimum leaves on testicular histology and spermiogram in the male albino rat (Wistar strain). Vet. Res. 2(3 -4): 42 - 46.
20. Lohiya NK, Ansari AS. Male contraceptive agents. In: Joy KR, Krishna A, Halder C (Eds). Comparative endocrinology and Reproduction. Narosa Publishing House, New Delhi, 1999, pp. 260-277.
21. Malini T, Manimaran RR, Arunakaran J, Aruldhas MM, Govinda RP. Effects of piperine on testes of albino rats. J Ethnopharmacol. 1999; 64:219-225.
22. Martin, Mary C. "Infertility" In Current Obstetric and Gynecologic Diagnosis and Treatment, edited by Alan H. Cecherney and Martin L. Pernoll. Norwalk, CT: Appleton & Lange, 1994.
23. Mather, J.P., Attie, K.A., Woodruff, T.K. et al. (1990) Activin stimulates spermatogonial proliferation in germ-Sertoli cell cocultures from immature rat testis. Endocrinology, 127, 3206-3214.
24. McLachlan RI. 2000. The endocrine control of spermatogenesis. BaillieÁ re's Clinical Endocrinology and Metabolism 14(3):345-362.
25. O'Donnell, L., McLachlan, R.I., Wreford, N.G. et al. (1994) Testosterone promotes the conversion of round spermatids between stages VII and VIII of the rat spermatogenic cycle. Endocrinology, 135,2608-1614.
26. Park, J.S., Hwang, S.Y., Lee, W.S., Yu, K.W., Paek, K.Y., Hwang, B.Y., and Han, K., The therapeutic effect of tissue cultured root of wild Panax ginseng C.A. Mayer on spermatogenetic disorder. Arch. Pharm. Res. 29, 800-807 (2006).

27. Saba AS, Oridupa OA, Oyeyemi MO, Osanyigbe OD (2009). Spermatozoa morphology and characteristics of male Wistar rats administered with ethanolic extract of Lagenaria breviflora. Afr. J. Biotechnol. 8(7): 1170 - 1175.
28. Sarkar SN, Majumdar AC, Chattopadhyay SK. Effect of isoproturon on male reproductive system: Clinical, histological and histoenzymological studies in rats. Ind J Exp Biol.1997; 35:133-138.
29. Setty BS, Riar SS, Kar AB. (1977). Androgenic control of epididymal function in rhesus monkey and rabbit. Fert Steril. 22:674–81.
30. Sharma N, Jacob D. Antifertility investigation and toxicological screening of the petroleum ether extract of the leaves of Mentha arvensis L. in male albino rats. J Ethnopharmacol. 2001; 75:5-12.
31. Sharpe, R. M. & Shakkebeak, N. E. Are oestrogens involved in falling sperm counts and disorders of the male reproductive tract? Lancet, 341(8857):1392-5, 1993.
32. Tony, M. P. & Gary, R. M. The Functional Significance Of FSH In Spermatogenesis And The Control Of Its Secretion In Male Primates. Endocr. Rev., 22(6):764-86, 2001.
33. Verma P.K. Sharma A. Mathur A. Sharma P. Gupta R.S.Joshi S.C. Dixit V.P. 2002.Effect of sarcostemma acidium stem extract on spermatogenesis. Asian J. Androl.1;43-47.
34. Zemjanis R (1977). Collection and evaluation of semen. In: Diagnostic and Therapeutic techniques in Animal Reproduction. Williams and Wilkins Company, Baltimore, U.S.A. p. 242.

**Table 1. Effect of Isabgol Chooranam on body weight of male albino rats.**

| **Parameter** | **Control** | **IC 50 mg/kg** | **IC 100 mg/kg** |
|---|---|---|---|
| Initial Body Weight (g) | 166.20 ± 1.88 | 164.20 ± 2.06 | 168.36 ± 1.86 |
| Final Body Weight (g)) | 185.80 ± 1.91 | 188.60 ± 1.33 | 184.52 ± 2.64 |

*$^{ns}P>0.05$, values expressed as Mean±SEM, n=6*

**Table 2. Effect of Isabgol Chooranam on reproductive organ weights of male albino rats**

| **Organ** | **Control** | **IC 50 mg/kg** | **IC 100 mg/kg** |
|---|---|---|---|
| **Testes** (g) | 1. 94 ± 0.02 | 2.20 ± 0.01** | 2.33 ± 0.02** |
| **Epididymis** (g) | 0.33 ± 0.03 | 0.40 ± 0.01* | 0.49 ± 0.01** |
| **Ventral prostate** (g) | 0.27 ± 0.02 | 0.34 ± 0.05 | 0.42 ± 0.01** |
| **Seminal vesicle** (g) | 0.48 ± 0.03 | 0.50 ± 0.01 | 0.60 ± 0.01** |
| **Vas deferens** (g) | 0.13 ± 0.02 | 0.14 ± 0.02 | 0.14 ± 0.01 |

**P<0.05; **P<0.01, values expressed as Mean±SEM, n=6*

**Table 3. Effect of Isabgol Chooranam on hematological and biochemical parameters in male rats after 28days of treatment.**

| Parameters | Control | IC 50mg/kg | IC 100mg/kg |
|---|---|---|---|
| Hemoglobin (gm %) | 12.44± 0.32 | 12.94±0.13 | 13.83± 0.22** |
| RBC (million/cu.mm) | 5.57± 0.04 | 5.72± 0.03* | 5.76± 0.03** |
| WBC ($X10^3$/cu.mm) | 4.34± 0.56 | 4.47±0.36 | 4.53± 0.82 |
| Blood sugar (mg/dL) | 78.03± 1.61 | 65.34± 2.72 | 63.33± 5.81* |
| Blood urea (mg/dL) | 31.72± 2.52 | 31.03±3.15 | 33.04± 3.03 |
| S.Cholesterol (mg/dL) | 83.02± 0.54 | 69.07± 1.04** | 63.03± 4.31** |
| S. phospholipids (mg/L) | 79.04± 0.63 | 74.08± 0.43** | 72.02± 0.53** |
| S. protein (mg/dL) | 7.86± 0.16 | 8.21±0.64 | 8.43± 0.39 |

**P<0.05; **P<0.01, values expressed as Mean±SEM, n=6*

**Table 4: Effects of Isabgol Chooranam on sperm count, motility, viability and abnormal morphology after 14 days treatment.**

| Groups | Count ($10^6$/ml) | Motility (%) | Viability (%) | Abnormal Morphology |
|---|---|---|---|---|
| **Control** | 8.10 ±0.28 | 85.40±1.07 | 96.00 ±1.52 | 2.18 ±0.38 |
| **IC 50mg/kg** | 8.73±0.62 | 83.10±2.14 | 95.20 ±1.77 | 2.23 ±0.24 |
| **IC 100mg/kg** | 9.21±0.37* | 92.70±1.18** | 95.70 ±1.45 | 2.17 ±0.37 |

***P<0.01, values expressed as Mean±SEM, n=6*

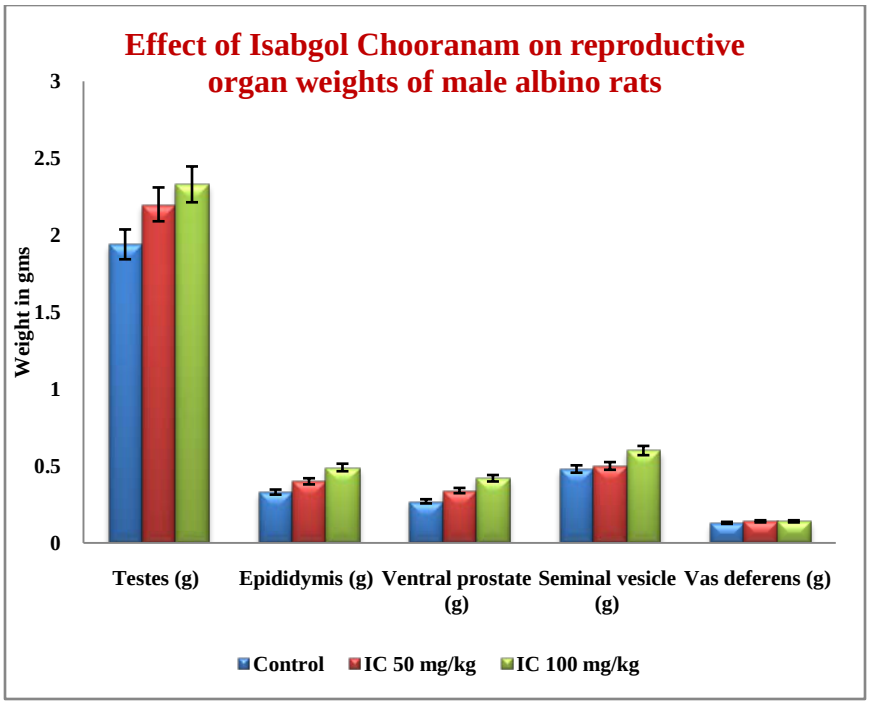
**Table 5: Effects of Isabgol Chooranam on sperm count, motility, viability and abnormal morphology after 28 days treatment**

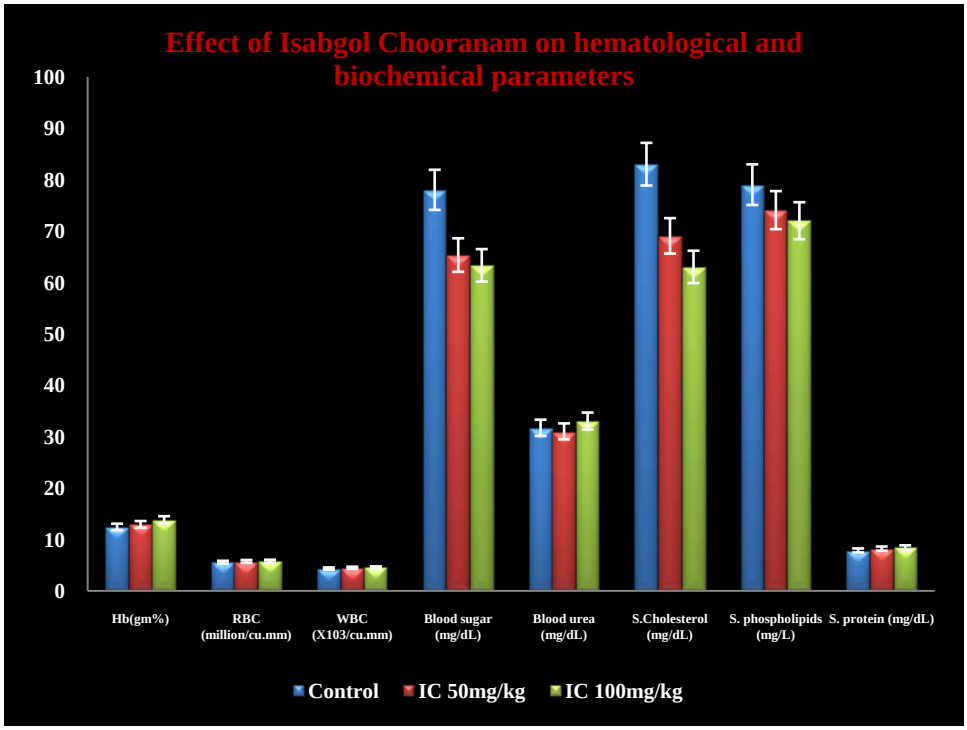
| Groups | Count ($10^6$/ml) | Motility (%) | Viability (%) | Abnormal Morphology |
|---|---|---|---|---|
| **Control** | 8.17±0.25 | 84.60±1.31 | 93.80 ±1.91 | 2.43 ±0.41 |
| **IC 50mg/kg** | 9.36±0.28* | 89.40±2.53 | 95.37 ±2.21 | 2.48 ±0.26 |
| **IC 100mg/kg** | 9.53±0.42* | 92.50±1.84* | 95.62 ±1.87 | 2.72 ±0.28 |

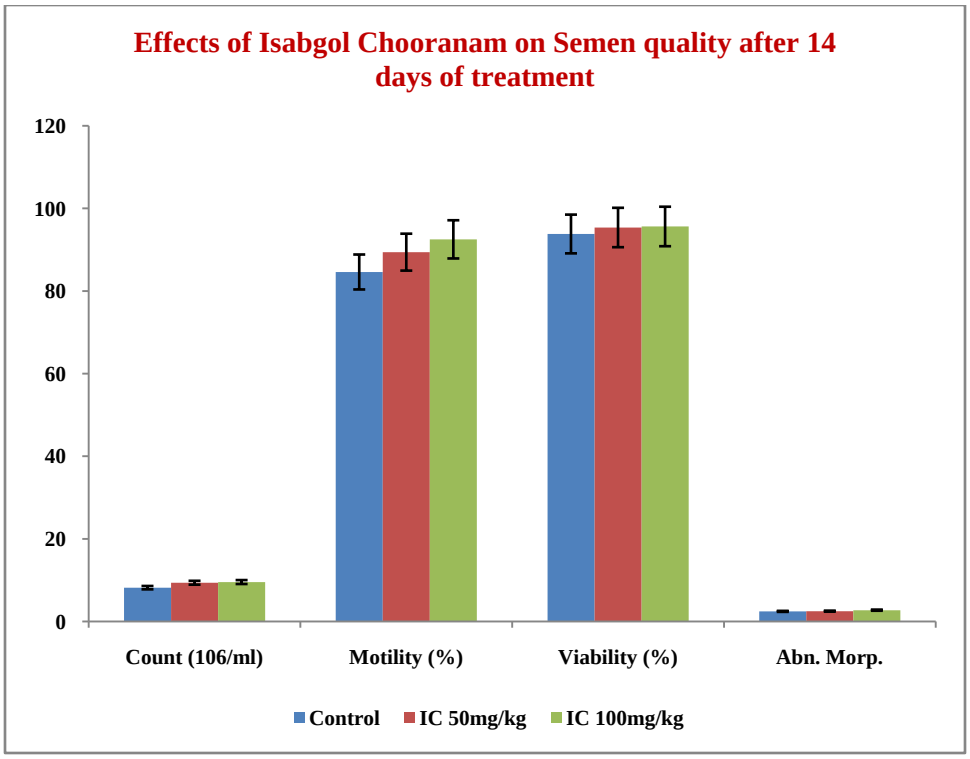
**P<0.05, values expressed as Mean±SEM, n=6*

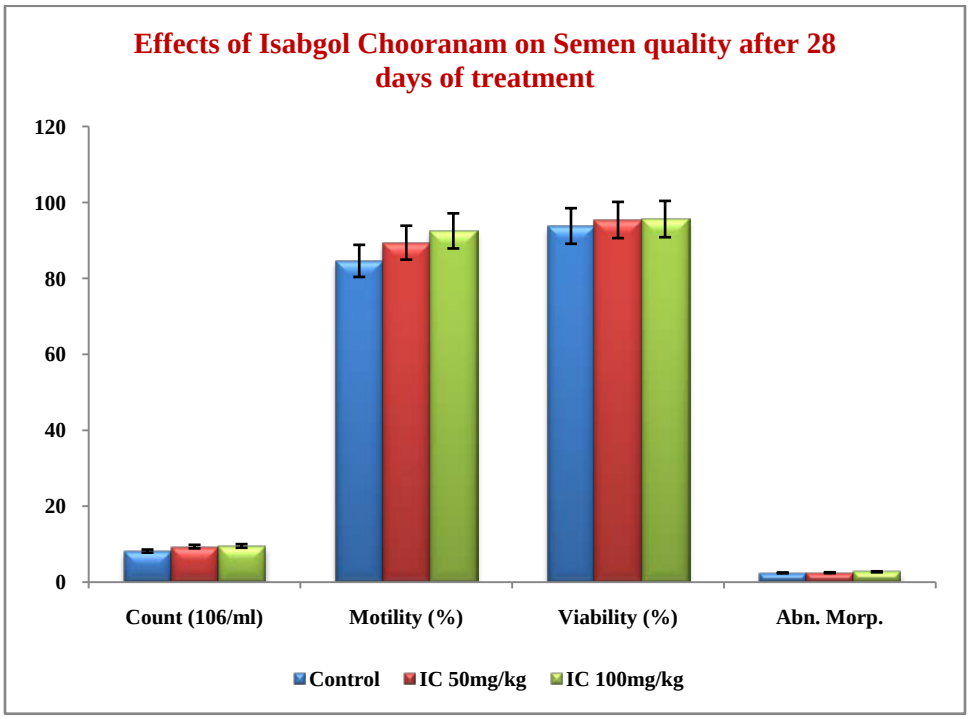
**Table 6: Effects of Isabgol Chooranam on Testosterone level after 28 days treatment**

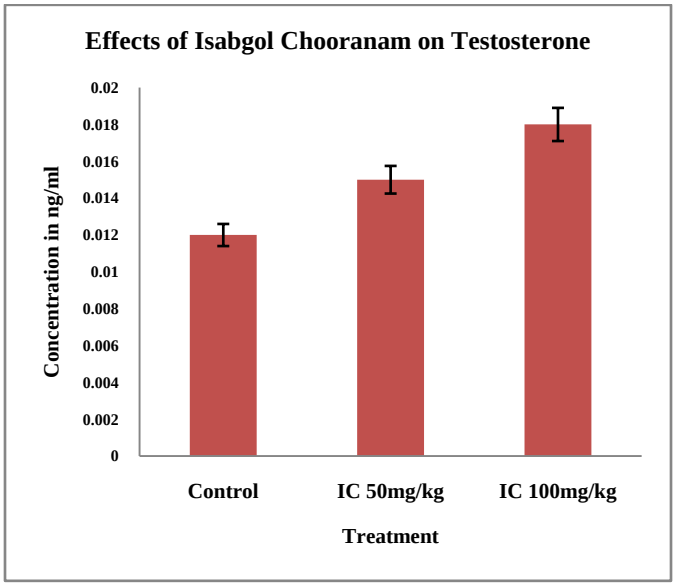
| Groups | Testosterone level (ng/ml) |
|---|---|
| **Control** | 0.012±0.018 |
| **IC 50mg/kg** | 0.015±0.014** |
| **IC 100mg/kg** | 0.018±0.017** |


Effect of Isabgol Chooranam on reproductive organ weights of male albino rats
Weight in gms
3
2.5
2
1.5
1
0.5
0
Testes (g)
Epididymis (g)
Ventral prostate (g)
Seminal vesicle (g)
Vas deferens (g)
Control
IC 50 mg/kg
IC 100 mg/kg


Effect of Isabgol Chooranam on hematological and biochemical parameters
100
90
80
70
60
50
40
30
20
10
0
Hb(gm%)
RBC (million/cu.mm)
WBC (X103/cu.mm)
Blood sugar (mg/dL)
Blood urea (mg/dL)
S.Cholesterol (mg/dL)
S. phospholipids (mg/L)
S. protein (mg/dL)
Control
IC 50mg/kg
IC 100mg/kg


Effects of Isabgol Chooranam on Semen quality after 14 days of treatment
120
100
80
60
40
20
0
Count (106/ml)
Motility (%)
Viability (%)
Abn. Morp.
Control
IC 50mg/kg
IC 100mg/kg

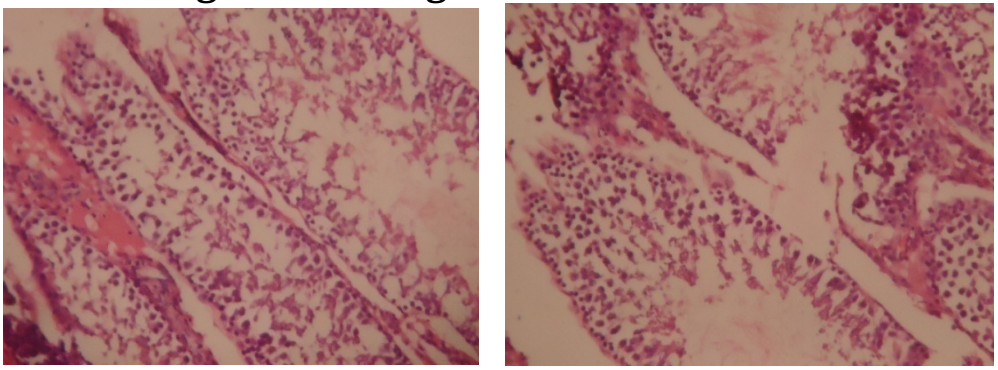

Effects of Isabgol Chooranam on Semen quality after 28 days of treatment
120
100
80
60
40
20
0
Count (106/ml)
Motility (%)
Viability (%)
Abn. Morp.
Control
IC 50mg/kg
IC 100mg/kg


Effects of Isabgol Chooranam on Testosterone
Concentration in ng/ml
0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
Control
IC 50mg/kg
IC 100mg/kg
Treatment

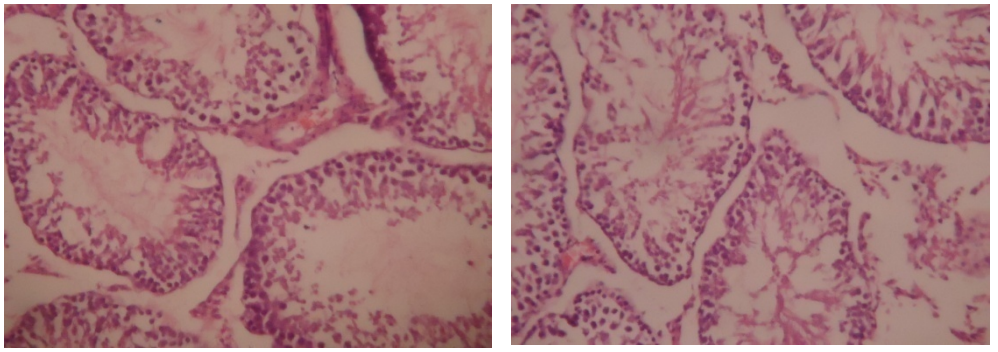
# HISTOPATHOLOGY OF PHARMACOLOGICAL STUDY

## Drug name: isabgol chooranam

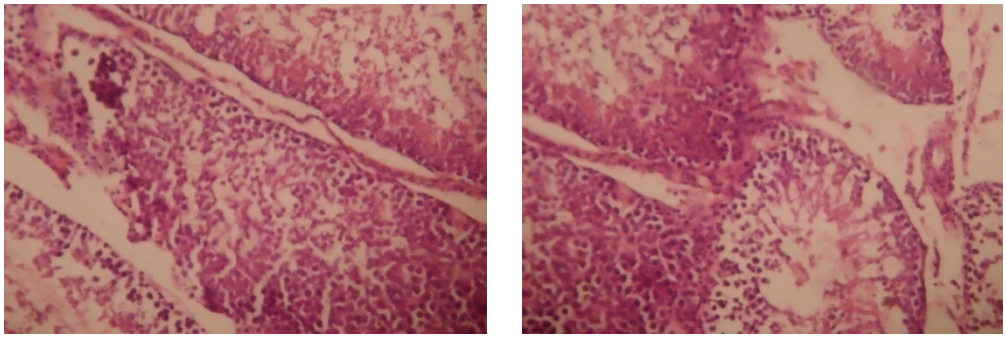
**control**



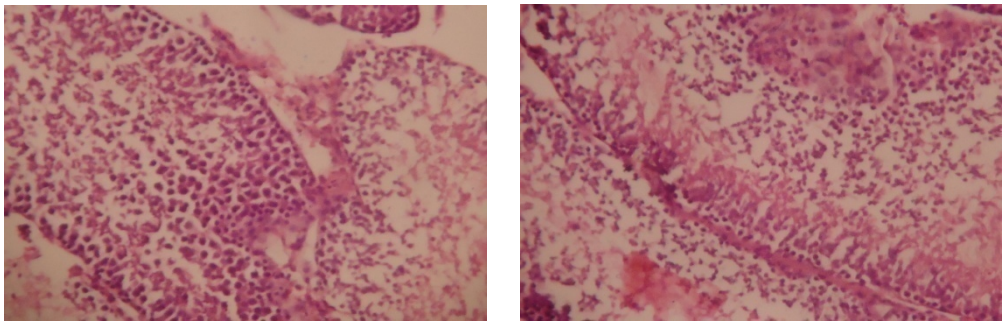
**Normal**



**50 mg**



**100 mg**



# Bio statistical analysis

## BIOSTATISTICAL ANALYSIS

### Effect of Isabgol Chooranam on Sperm Count in human subjects

| S.No | Sperm Count(million/cumm) | |
|---|---|---|
| | Before Treatment | After Treatment |
| 1 | 42 | 70 |
| 2 | 25 | 48 |
| 3 | 17 | 25 |
| 4 | 19 | 59 |
| 5 | 9 | 45 |
| 6 | 67 | 70 |
| 7 | 15 | 45 |
| 8 | 35 | 50 |
| 9 | 60 | 85 |
| 10 | 12 | 16 |
| 11 | 2 | 45 |
| 12 | 50 | 68 |
| 13 | 45 | 70 |
| 14 | 15 | 45 |
| 15 | 59 | 75 |
| 16 | 25 | 50 |
| 17 | 9 | 56 |
| 18 | 20 | 30 |
| 19 | 18 | 20 |
| 20 | 70 | 75 |

**Software:** spss17 version

**Variables:** Sperm Count (millions/cu mm) – before treatment, after treatment

**Number of cases:** 20

**Test:** Paired t test

**Confidence Interval:** 95%

**Correlation coefficient (r):** 0.774

**Before and after treatment mean difference:** 21.65±13.75 (millions/cu mm)

**P Value (2 tailed):** $p<0.01$.

**Inference:**

The p value is significant (p<0.01). So the treatment was significantly improving the Sperm count (millions/cu mm).

**Treatment for Aan Maladu**

The most popular statistical tool, namely, Fisher's Exact Test analysis has been employed to analyses the effectiveness with the help of a hypothesis.

**Hypothesis**

There is no reducing symptoms among the patients for the treatment of Aan Maladu.

| Symptoms | Number of Cases | |
|---|---|---|
| | Reduced | Not Reduced |
| **Premature ejaculation and Erectile dysfunction** | 4<br>66.7% | 2<br>33.3% |
| **Premature ejaculation and Nocturnal Emission** | 4<br>66.7% | 2<br>33.3% |
| **Nocturnal Emission** | 3<br>100% | 0<br>0% |

**Software:** spss17 version

**Number of cases:** 15

**Test:** Fisher's Exact test

**Confidence Interval:** 95%

**Result:**

**P Value (2 tailed):** p<0.05

**Inference:** Since the p value is significant (<o.o5), The hypothesis is not accepted. So there is significant reduced symptoms among the patients for the treatment of Aan Maladu. Hence it is concluded that the treatment was effective and significant.

# Consent form

## CONSENT FORM

I certify that I have disclosed all the details about the study in the terms readily understood by the patient.

DATE : SIGNATURE

NAME

## CONSENT BY THE PATIENT

I have been informed to my satisfaction by the attending physician for the purpose of the clinical trial and the nature of the drug treatment and follow up including the lab investigation to be performed to monitor and safeguard my body functions.

I am aware of my right to opt out of the trial at any time during

the course of the trial without having to give reasons for doing so.

I ,exercising my free power of choice, here by give my consent to be included as a subject in the clinical trial of **ISABGOL CHOORANAM** for the treatment of **AAN MALADU.**

DATE: SIGNATURE

NAME

# §¿¡Â¡Ç‹Â‹ý ´ôÒ¾ø ÀÊÅõ

¾Õ. _____ ¬ ¸‹Â ¿¡ý _____ÅÂÐ, (_____
_____,
Å°‹ì Ì õ þ¼õ) ±ý ÍÂ ¿‹¨ É×¼ý ±Ø¾‹ì ¦¸¡ Î ì Ì õ ´ôÒ¾ø ÀÊÅõ.

¿¡ý ¬ ñ ÁÄ Î (¬ ñ ¨Á Ì ¨È×) ±ý Ûõ §¿¡Â¡ø À¡¾‹ì¸ôÀð Î ¦°ý ¨ É,«ÃÍ °‹ò¾ ÁÕòÐÅ ¸øæ¡‹Â‹ø (þ¼õ: «È‹»÷ « ñ ½¡ þó¾‹Â ÁÕòÐÅÁ¨ É, «ÕõÀ¡ì¸õ, ¦°ý ¨ É-106.) ¿¼ò¾ôÀ Î õ °‹ò¾ ÁÕòÐÅ ¬Ã¡öî°‹ ãÄõ °‹¸‹î ¨° ¦ÀÈ±ý ÍÂ ¿‹¨ É×¼ý ÓØ°õÁ¾ò¨¾Ôõ ¦¾¡‹Å‹òÐì ¦¸¡û¸‹§Èý.

þó¾ ¬Ã¡öî°‹Â‹ý §¿¡ì¸õ, ÁÕòÐÅõ ¦°öÔõ Ó¨È, ¦¾¡¼÷¸ ñ ¸¡½‹ôÒ ÁüÚõ ±ý ¯¼ø¿Äõ ÌÈ‹ò¾ ÁÕòÐÅ À¡‹§°¡¾¨É¸¨Çô ÀüÈ‹Â Å¡‹Å¡É Å‹Çì¸õ ±Éì Ì ÁÕòÐÅõ ¦°öÔõ ÁÕòÐÅ÷ ãÄõ ¦¾Ç‹×À Î ò¾ôÀð Î ûÇÐ. þó¾ ¬Ã¡öî°‹Â‹ø Àí Ì ¦¸¡û Ùõ ±ý °õÁ¾ò¾ü Ì Â¡Õ¨¼Â ¿÷Àó¾Óõ ¸¡Ã½Á‹ø¨Ä±ýÀ¨¾ ¦¾¡‹Å‹òÐì ¦¸¡û¸‹§Èý.

þôÀÊì Ì,

¦ÀÂ÷ :
Ó¸Å¡‹ :
¿¡û

# Case sheet proforma

**CASE SHEET**

**POST GRADUATE DEPARTMENT - BRANCH-I**

**(POTHU) MARUTHUVAM**

GOVT. SIDDHA MEDICAL COLLEGE & ANNA HOSPITAL, CHENNAI-106.

**CASE SHEET PROFORMA FOR "AAN MALADU"**

| | | | |
|---|---|---|---|
| WARD NO. | : | NATIONALITY | : |
| I.P. NO | : | RELIGION | : |
| BED NO | : | OCCUPATION | : |
| NAME | : | INCOME | : |
| AGE | : | D.O.A | : |
| SEX | : | D.O.D | : |
| PERMANENT ADDRESS : | | | |
| | | DIAGNOSIS | : |

TEMPORARY ADDRESS:

Govt. Siddha Medical College &
Anna Hospital, Chennai – 106. MEDICAL OFFICER :

---

**COMPLAINTS AND DURATION :**

**HISTORY OF PRESENT ILLNESS:**

**HISTORY OF PAST ILLNESS : Yes No**

| | | | |
|---|---|---|---|
| Mumps / Orchitis | : | ☐ | ☐ |
| Prostatitis | : | ☐ | ☐ |
| STD | : | ☐ | ☐ |
| Diabetes mellitus | : | ☐ | ☐ |
| Hypertension | : | ☐ | ☐ |
| Cardiac diseases | : | ☐ | ☐ |

| **Surgical history** | **:** | **Yes** | **No** |
|---|---|---|---|
| Hydrocele | : | ☐ | ☐ |
| Varicocele | : | ☐ | ☐ |
| Blockage of vas | : | ☐ | ☐ |
| Hernia | : | ☐ | ☐ |
| Obstruction of ejaculatory duct | : | ☐ | ☐ |
| Trauma | : | ☐ | ☐ |

**PERSONAL HISTORY & HABITS :**

A. Diet : Veg. ☐ Non veg. ☐

B. Marital status : single ☐ married ☐

C. Duration of marriage (yr) :

D. Consanguineous : Yes ☐ No ☐

E. **Sexual history**

F. Erectile function : Normal or Affected

G. Ejaculatory effect : Normal or Affected

H. Frequency of intercourse (per/month) :

I. Frequency of masturbation (per/month) :

J. Lubricants : Yes ☐ No ☐

K. Nocturnal Emission : Yes ☐ No ☐

L. Painful coitus : Yes ☐ No ☐

M. Burning micturition : Yes ☐ No ☐

N. Spermaturia : Yes ☐ No ☐

O. Emotional stress : Yes ☐ No ☐

P. Addiction : Yes ☐ No ☐

a. If yes specify :_____

Q. Bowel habit : Regular ☐ Constipation ☐

R. Sleep : Good ☐ Disturbed ☐ Insomnia ☐

S. Presence of anxiety : Yes ☐ No ☐

**FAMILY HISTORY:**

- No. of abortions his wife had Yes ☐ No ☐
- Cardiovascular disease Yes ☐ No ☐
- Tuberculosis Yes ☐ No ☐
- Others Yes ☐ No ☐

If yes specify :

| **HISTORY OF CONGENITAL ANOMALIES** : | Yes | No |
|---|---|---|
| Cryptorchidism | ☐ | ☐ |
| Hypospadias | ☐ | ☐ |
| **DRUG HISTORY** : | Yes | No |
| Steroids | ☐ | ☐ |
| Anti – depressants | ☐ | ☐ |

.

**GENERAL EXAMINATION:**

1. Physical build : lean normal obese
2. Body weight :
3. Temperature :
4. Pulse rate :
5. Heart rate :
6. Respiratory rate :
7. Blood pressure :
8. Pallor :
9. Cyanosis :
10. Jaundice :
11. Clubbing :
12. Pedal oedema :
13. Lymphadenopathy :
14. Acanthosis nigricans :
15. Hirsutiom :

**EXAMINATION OF VITAL ORGANS**

- **CVS** : Normal ☐ Abnormal ☐
  - If abnormal , details_____
- **CNS** : Normal ☐ Abnormal ☐
  - If abnormal , details_____
- **Respiratory system** : Normal ☐ Abnormal ☐
  - If abnormal , details_____
- **Digestive system** : Normal ☐ Abnormal ☐
  - If abnormal , details_____
- **Urogenital system** : Normal ☐ Abnormal ☐

- If abnormal , details_____

## Local examination

- **INSPECTION :** Yes No
- Hydrocele **:** ☐ ☐
- Varicocele **:** ☐ ☐
- Inguinal Hernia **:** ☐ ☐
- Filarial Scrotum **:** ☐ ☐
- Both testicles present in scrotum **:** ☐ ☐
- **PALPATION:**
- Size and Consistency of testicles **:** Normal ☐ Abnormal ☐

**SIDDHA ASPECTS**

Yaakai (udal nilai)

1. Vatham ☐
2. Pitham ☐
3. Kapham ☐
4. Kalappu ☐

Mukkunam

1. Sathuva gunam ☐
2. Raasatha gunam ☐
3. Thamo gunam ☐

**PARUVA KAALAM (SEASONS)**

1. Kaar Kaalam (Aavani-Puratasi) Aug-sept. ☐
2. Koothir Kaalam (Iypasi-Karthigai) Oct-Nov. ☐
3. Munpani Kaalam (Maargazhi-Thai) Dec-Jan ☐
4. Elavenil Kaalam (Chithirai-Vaikasi) Apr-Ma ☐
5. Mudhuvenil Kaalam (Aani-Aadi) Jun-Jul ☐

## NILAM (PLACES)

1.Kurinchi (Hills Areas) ☐
2.Mullai (Forest Areas) ☐
3.Marudham (Fertile Areas) ☐
4.Neithal (Sea Areas) ☐
5.Paalai (Desert Areas) ☐

## IYAMPORIGAL/PULANGAL

1. Mei (Sensation) :
2. Vaai (Taste) :
3. Kann (Vision) :
4. Mooku(Smell) :
5. Sevi (Hearing) :
6. Sevi (Hearing) :

## KANMENTHIRIYAM / KANMAVIDAYAM

1.Kai [Koduthal] :
2.Kaal [Nadathal] :
3.Vaai [Pesal] :
4.Eruvai [Malam Kazhithal] :
5.Karuvai [Aananthithal] :

## MUMMALAM

1. Malam
2. Moothiram
3. Viyaravai

## UYIR THATHUKKAL: Vatham:

1. Pranan :
2. Abanan :
3. Viyanan :
4. Udhanan :
5. Samanan:
6. Naagan:
7. Koorman:
8. Kirukaran:
9. Devadathan:
10. Dhananjeyan:

## PITHAM:

1. Anal Pitham:
2. Ranjaga Pitham:
3. Saadhaga Pitham:
4. Aalosaga Pitham :
1. Prasaga Pitham:

## KAPHAM:

1. Avalambagam:
2. Kiledagam:
3. Podhagam:
4. Tharpagam:
5. Santhigam:

## UDAL THATHUKKAL:

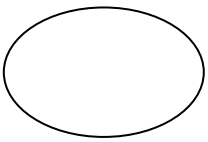
1. Saaram :
2. Senneer :
3. Oon :
4. Kozhuppu :
5. Enbu :
6. Moolai :
7. Sukkilam :

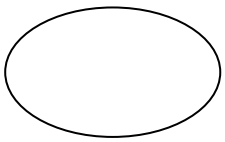
**ENVAGAI THERVU:**

1. Naa -
2. Niram -
3. Mozhi -
4. Vizhi -
5. Sparisam -
6. Malam
    a. Niram
    b. Nurai
    c. Erugal
    d. Elagal
7. Moothiram
    a. Neerkuri
        1. Niram
        2. Edai
        3. Manam
        4. Nurai
        5. Enjal
    b. Neikuri
8. Naadi

**Neikuri examination:**

**Before treatment:** **After treatment:**





**SIGNS AND SYMPTOMS :**

| Sl.No | Clinical Features | Before Treatment | During Treatment of every 15 days | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th |
| 1 | Premature ejaculation | | | | | | | | | |
| 2 | Erectile Dysfunction | | | | | | | | | |
| 3 | Painful coitus | | | | | | | | | |
| 4 | Nocturnal emission | | | | | | | | | |
| 5 | Burning micturition | | | | | | | | | |

**LABORTORY INVESTIGATIONS:**

**BT** **AT**

1.Blood Tc
Dc
ESR
Hb
Bl-sugar (R)
Bl.Urea
Sr.Cholesterol
Sr.Creatinine
VDRL test

2.Urine - albumin
Sug
Dep:

3.Motion- Ova
Cyst

4.Semen Analysis

| Semen analysis | Before Treatment | After Treatment |
|---|---|---|
| Count | | |
| Volume(ml) | | |
| Viscosity | | |
| Liquification time | | |
| Sperm concentration(millions/cu mm) | | |
| Motility(%) | | |
| Active motile(%) | | |
| Sluggish motile(%) | | |

Morphology

Other Investigations

**TRAIL DRUG: ISABGOL CHOORANAM**

**Dose: 1 gm (bd)**

**Anubanam: milk**

**Duration of treatment: 90 days**

**Pathiam (Do's and Don'ts) :**

**Prognosis at the end of the treatment :**

**Medical Officer Signature:** **H.O.D**

# Bibliography

# BIBILIOGRAPHY :


1. Pathinen Siddhar Gunavagadam Nadi Sasthiram
2. Pathinensiddhar Naadi sasthiram
3. Koshayi Anuboga vaithyam Navanedham
4. Thiruvalluvar Gnanavettiyan
5. Sivavakkiyar Paadal
6. Agasthiyar  Vaithya chillaraikovai
7. Arivaiyar chinthamani
8. Thirumoolar karukkidai vaithyam
9. Varmam-108
10.Vatha noi thoguthi(Nithanam)
11. Agasthiyar Vaidhya Chinthamani venpa-4000
12. Agasthiyar Vaidhya Chinthamani
13. Theraiyar Yamaga Venba
14. Nandheesvar Nigandu
15. Anuboga Vaidhiya Navaneetham
16. Magaliar maruthuvam – Dr. P.M. Venugopal
17. Noi nadal noi muthal nadal thirattu – part 1 & 2 – Dr.M. Shanmugaelu H.P.I.M
18. Siddha maruthuvam – Dr. K.N. Kuppusamy mudhaliar H.P.I.M.
19.Thirumoolarin thirumanthiram virunthu – Mr. P. Sampanthan
20. Yugi vaidhiya sinthamani
21. Gunapadam mooligai – Dr. K.S. Murugesa mudhaliar
22. Siddha maruthuva sirappu – Dr. R. Thiagarajan L.I.M.
23. Siddha aruvai maruthuvam – Dr. K.S.Uthamarayan H.P.I.M.
24. The wealth of India – Vol – III, V, VI & VIII
25. Text book of medical physiology – Dr. Guyton and hall
26. Indian material medica – Dr. K.M. Natkarni – Vol – I & II
27. Siddha principles of social and preventive medicine – Dr. G. Durairasan

28.Introduction to siddha

29. Harrison principles of internal medicine – Dr. Kasper, braunward, hanser, jameson

30. Male reproductive dysfunction – Dr. S.C. Basu. F.R.C.S.

31. Natural infertility – Dr. Francesca naish

32. Compendium of Indian medicinal plants – Ram. P. Rastagi and B.N. Mehrota.